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The Relation of Histology to Pathology*

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Histology is one of the most rapidly growing of the medical sciences and is being continuously enriched by a stream of research publications from all parts of the civilized world. This vast increment of new and diverse material has provided a much firmer foundation for pathology. The prevailing interest of its investigators, many of whom are pathologists, in functional interpretations and pathologic applications has greatly broadened its outlook and changed its entire complexion. The contacts of histology with pathology have accordingly become much closer and more numerous, and the opportunities for making pathologic correlations during the histologic teaching have been multiplied.

Formerly histology was in a rather isolated position, with relatively little practical bearing in the medical course, but as more natural methods for studying tissues came into use, such as the direct and continuous observation of living cells in tissue cultures, or in the transparent tails of tadpoles, the reactions of the cells could be witnessed under normal and abnormal conditions, and facts of interest and importance to pathologists were brought to light. These include the growth and movements of living normal and tumor cells, the reactions of the cytoplasm in phagocytosis, and a host of other conditions. Microdissection has given us much new information on the structure of cytoplasm; motion pictures have demonstrated accurately the visible changes in cells and cell organoids, and the numerous improvements in fixation and staining have enabled us to see the minuter details of cell structure more clearly. Many of the new discoveries of physics and chemistry have been enlisted in cytologic research, such as the registration of the reactions of cells under X-rays, radium and other forms of radiation, or the effect of "heavy water" on cells. These are only a few examples of the newer methods for cell research. In the literature which records these modern intimate and accurate scrutinies into the body's minuter living parts there is manifest a truer and clearer reflection of Nature. We are getting a little closer to the real mean-

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ing of life itself. The importance of all this in medical education can hardly be over-emphasized. We are but colonies of specialized cells, and the more we know about these units, the better will we understand our patients. In living things it is evident that structure does not exist apart from function, and it is equally true that the normal passes directly over into the abnormal.

This advanced position in the evolution of our micro-anatomic understanding is well set forth in the leading American histologic textbooks. A quarter of a century ago, a textbook of histology was no more than a series of morphologic pictures showing little connection with one another, and practically none with other medical subjects. Now, the body of facts is so put together as to give a close-up view of the functioning tissues of the living human body in health, and to afford a much better basis for an understanding of their modifications in disease. Interpretation of Nature, synthesis as well as analysis, and above all, integration with ancillary sciences—these are the watchwords. For instance, in one book[1] published in this country within the last three months, the blood-vascular system is placed in a central position, and contributory systems, such as the alimentary tract, the lungs, the endocrine organs and the kidneys, are directly integrated with it. When the various parts of the histologic fabric are thus knitted together their meaning becomes clearer, and the student sees them related to the body as a whole. The resultant unification of the course renders it more vivid, significant, practical; its teachings can be applied more easily and more directly. But this author has gone much farther, and has scattered through his book many striking examples of histopathologic liaisons, as in his discussion of the histologic aspects of arteriosclerosis, allergy, avitaminosis, gigantism and acromegaly in relation to acidophile hyperpituitarism, parasitic infestations of different types (as the red cells in malaria and East Coast fever, and the lymphocytes in *Theileria parva*), and a host of others. In another American histologic textbook[2] appear numerous correlations with physiology and pathology; as, for instance, a discussion of the normal cellular defense mechanisms of the body; regenerative and reparative phenomena in nerve fibers, cartilage, bone, muscle, etc.; and normal age changes in tissues, such as in the thymus. Many of these contacts were unheard of in such books a few years ago. Other examples might be cited, for this trend is gathering head.

Thus, with the closure of the gap which formerly existed between histology and pathology it is easy for the teacher of histology, while establishing the normal for the minute structure of the body, to make correlations all along the line, and continually to give the student interesting glimpses of the pathologic field where he is to apply his histologic knowledge.

Because he is shown direct applications, he becomes much more interested and works more energetically and more effectively. His memory is improved, for the normal becomes more sharply focused from having been set off against the abnormal.

A new orientation in medical education thus becomes imperative—that of foreshadowing, in the histologic course, as many as possible of the applications to be made in pathology. How may such correlations be effected to gain the maximum advantage for the student without infringing on the domain of the pathologist?

HISTOPATHOLOGICAL CORRELATIONS

Normality.—Let us begin with the question of normality itself. The newer histology teaches that, particularly for some tissues, this is not a constant quantity, but varies with a number of factors, for instance, age, and the stage of the functional cycle.

The variation in structure according to age is important for many tissues, and particularly so for certain of them, such as the arterial wall, the spleen, the uterus or the renal cortex. The student should be taught the normal appearance of the principal tissues for the different age periods. Certain degenerative changes are to be expected as a normal occurrence with advancing age, and should only be considered abnormal when they occur precociously. A case in point would be the early degeneration in the myocardium which has such a direct and important relation to the present increase in mortality from cardiovascular conditions.[3] One person in four of all ages will die of cardiovascularrenal disease.

Other changes, not to be regarded as degenerative, but as physiologic alterations, have their distinct pathologic correlations. Mention of these, when studying the normal, strengthens the impression of both normal and abnormal states in the mind of the student through giving him a set of association ideas by which to remember them. Thus, the decrease in vascularity of the valves of the heart from a rich blood supply in fetal life to an avascular condition in the adult is correlated with the greater frequency of valvular lesions in acute rheumatic disease in early life and their diminished incidence in later life. So, too, the greater involvement of the septal cusp of the mitral valve in rheumatic endocarditis appears to be associated with the fact that it remains vascular longer than the other valves.[4]

The blood supply of the heart itself is altered with age[5]; thus the right side of the heart in youth has the more abundant vascularity, while the left side has the greater supply in old age: also the anastomoses on the left side become more numerous with increasing age. These facts are regarded as explanations of the greater number of failures of the right side

of the heart in pneumonia in old age, and the greater ability of the old heart, as contrasted with the younger myocardium, to withstand the shock of sudden arterial occlusion. Such points can be brought before the student effectively at the proper time.

The changes in the thymus with age must be known if correct pathologic interpretations are to be made, the age of the patient being the criterion on which one bases the estimation of hypertrophy. The degeneration of the elastic tissue, not only in the arterial tree but in the entire body (lungs, bronchi, skin, etc.), must be known and correlated with the abnormal conditions found there. Variations in the amount of calcification in bones with age can be correlated not only with the fragility of bones at different ages but with the appearance of the bone in X-ray plates.

Such accurate knowledge of cellular and tissue appearances for the different ages enables the student to assess the value of departures from these standards in his pathologic material.

Then, there are many instances in which normal variation with function should be noted. Sometimes the cycle is brief in time, as in the salivary glands, or it may be of longer duration. Take, for instance, the liver, which modern histology shows to undergo a diurnal cyclic change in which the assimilatory phase is dominant at night (when the body temperature is lowest) and the secretory phase during the day. Appearances which were formerly thought to indicate degenerative changes in the hepatic cells have been shown by Forsgren and others[6] to be indicative of high water and glycogen content; and a familiarity with the newer facts prevents the pathologist from falling into error.

In the thyroid, too, there is a wide variation in normal appearance due to the extent of colloid storage and other factors, and conditions formerly registered as colloid goiters or hyperthyroidism are now regarded as being within the range of normality. The recent work of Rienhoff[7] on normal and pathologic thyroid structure is very helpful. Correlations of biochemistry and physiology with histology are important here; as also in the case, for instance, of ovarian glandular structures, their hormonic products, and the action of these.[8]

The histologic changes in the uterus during the different phases of the menstrual cycle and pregnancy will come to mind, along with many others. Before the description by Hitschmann and Adler,[9] in 1907, of the changes in the endometrium occurring during the various phases of the menstrual cycle, glandular endometritis was the condition most commonly met with in gynecologic practice; while today it is much less frequent as a pathologic entity, most of these cases being now recognized as the normal premenstrual phase of the uterine mucosa. A pathologic diagnosis of uterine

curettings cannot be made accurately without knowledge of the phase of the menstrual cycle in which the curettage was performed (Boyd,[4] p. 541).

Prior to the report of Rosenburg[10], in 1922, that the mammary parenchyma normally presents alternate evolutionary and involutionary changes seeming to reflect those going on at the same time in the endometrium, it was thought that, except for age changes, there was only one normal morphology for the non-lactating gland. Now the normal is regarded as varying somewhat with the phases of the menstrual cycle; and although there is some uncertainty as to just what the exact normal histologic appearance is for any given period in this cycle (Dawson[11]) it seems to be generally agreed that normality here is not unity, but a series. Thus, it is important that the student should become familiar with this succession of normal histologic pictures as an approach to his study of the pathology of the breast. Doubtless the conditions formerly interpreted as benign hyperplasia or chronic mastitis were, in many cases, but the normal efflorescence of the mammary cells behaving in sympathy with the coincident premenstrual changes in the endometrium.

Histologic investigations in normal variabilities of this kind are by no means completed, and the textbooks of the future will undoubtedly record more instances, and also much more detail regarding them; but enough has already been published to prove that the histologic picture is often far from constant. This has made possible much more practical cooperation with the pathologist than in former years. On the histologist devolves the responsibility of defining the normal, and this is a relative, not an absolute, quantity.

The Connective Tissues.—Let us consider another instance of how the newer histologic interpretations aid pathologic teaching. Let us realize something of the way in which the knowledge of what are known as the "connective tissues" has broadened under modern research influence. Where formerly these were regarded as being merely inert, they are now seen to be alive, responsive to stimuli, capable of cellular defense and repair. Their old, purely mechanical, uses have been retained, of course, but a host of new virtues has been added. Tendon is something more than an unstretchable cord; it is vital, nerve sentient, blood nourished, adaptable to modern surgical technics of splicing, transplantation or even to use as living suture material.[12] Bone is not dead, but capable of marvelous reactions, not only in the repair of injuries, such as fractures or trephine wounds and in the setting of bone-grafts, but in opposition to bacterial invasion. The newer vital staining methods have made clearer the cytologic phenomena in bone growth and repair,[13] and modern research enables us actually to witness the cellular reactions in the knitting of bone.[14] Carey's[15] searching bone

studies are valuable. Convincing evidence of the vital adaptability resident in the osteocytes is seen in the maintenance by bone of its integrity from day to day under severe stress and strain. These sharper, clearer pictures provide a better background for pathologic work. The histologist, in teaching bone growth, can correlate his subject not only with the newer work in biochemistry and physics, but with such conditions as rickets, where opportunity is afforded for stressing the normal dependence of the osteoblasts on hormones, vitamines and suitable radiation. Interest may be aroused by the exhibition of gross and microscopic specimens of bone repair or pathologic conditions, such as osteogenesis imperfecta and multiple enchondromata. The fundamental cells of the connective tissues, the fibroblasts, are now presented as dynamic and indispensable reparative agents without whose aid no wound would ever heal.

These advances, however, are dwarfed in interest by those in what may be termed, paradoxically, the "non-connective" part of the connective tissues, in which a new department of knowledge has been opened up of such importance as to merit special treatment in the textbooks. In effect, it is a modernized histologic interpretation of the *milieu interne* of Claude Bernard.[16] The loose connective tissues are now regarded as containing in their meshes a vast ocean of tissue fluid, often called pericellular fluid, as Cannon[17] and others have more recently pointed out. Cowdry[1] has mapped some of its parts. This ocean was not appreciated by the histologists of older times because their defective methods blinded them to its existence, and even yet its boundaries are ill-defined. This tissue fluid has been held by Macallum[18] to be of the same composition and concentration of salts as the waters of the primeval ocean from which life emerged. It is populated by myriads of phagocytic cells, the macrophages or histiocytes. In it battles are constantly being fought, which might be classed as naval engagements, and submarine at that, for in the course of everyday life we find this macrophage system ever on guard, and often called on to quell minor disturbances. In emergencies this ocean becomes, as Maximow has well termed it, "the arena of inflammation," and life-and-death conflicts occur in it in which the ordinary police and scavenger cells are joined by the warrior granulocytes from the blood.

In teaching histology, we cannot, of course, go into the details of an infection such as erysipelas, but we can show the reaction potencies of the macrophages and the conflagration hazard of the tissue-fluid spaces; in other words, we can lead the student to the border and give him such glimpses of related pathologic processes occurring in these tissues as to imbue them with significance, and to make the transition from the one discipline to the other easy and rapid. We cannot deal with the connective

tissues without regarding them as battlefields, and this is well, for it serves to bring vividly before the mind of the student the fact that the human organism must constantly be on guard against invaders and dangers in many forms; and that its tissues have elements and mechanisms specially evolved to cope with such menacing agents.

We can elucidate these points by modern experimental methods, as that of vital staining, which demonstrates the macrophage reaction, as Evans[19] and others have shown, not only in the loose connective tissue but in allied regions, such as injured lymph nodes, spleen, bone marrow and liver. Indeed, it was by reason of their similar reaction to the vital dyes that the scattered cellular elements comprising the reticulo-endothelial system were gathered into one great functional group. Fractures undergoing repair and the inflammatory and reparative reactions in brain tissue following stab wounds with a hot needle[20] provide instructive histologic pictures, as drawn by the vital dyes, whose message may be translated directly into pathologic terms. The reactions of special types of macrophages, such as those of the lungs, may be taken up in their proper place.

The relation of the blood phagocytes to the connective tissues is well revealed in pyogenic inflammations. Use may be made of the web of the frog's foot, or other living material, under conditions of inflammation, in these demonstrations, which all suggest to the student that the so-called pathologic reactions of cells are merely their normal protective and defense responses to abnormal stimuli. In coping with deleterious conditions normal cells may become deformed and abnormal. The lesson of direct transition from normal to abnormal is vivid and easily remembered, and stimulates the student to think and to formulate problems which he may investigate later.

Modern histologic methods have given us clear pictures of growth and functional phenomena of interest to pathologists in other structures occupying the loose connective tissues. The progression and reactions of lymphatics, for instance, have been studied under the high powers of the microscope in the transparent tails of living tadpoles,[21] while in similar material Speidel[22] has learned much about the formation of myelin around the neuraxis. The Clarks[23] have just published their interesting observations on the formation of arteriovenous anastomoses as seen in their ingenious glass chambers in the ears of rabbits, where the living transparent film between the double windows of these devices may be studied for days and even months. They remark in closing: "It is perhaps not too much to hope that these studies may lay the basis for a rational control of the pathological arteriovenous anastomoses encountered occasionally by the clinician."

In presenting the various types of epithelium, similar opportunities

may be taken to build bridges leading into the domain of pathology. This tissue, normally forming a continuous sheet, may abnormally suffer discontinuities, as in wounds and ulcers, and its protective reacting power is seen in the repair of such lesions, as in the skin and mucous membranes. Vivid demonstrations of growth phenomena may be given, as in skin grafts.

Cancer.—One of the most inviting opportunities for correlation is afforded by the subject of cancer, which is but an abnormal cellular growth phenomenon,[24], and can well be introduced when growth in general is being considered. Growth is primarily a histologic problem, intimately bound, though it be, to those sciences dealing with such agents as the hormones, vitamines and radio-activity; and the phenomena of cancer are included in it. Visible morphologic alterations can be pointed out. One notes with pleasure that Campbell[25], in his admirable summary of progress in cancer research to date, stresses the fact that morphologic workers "laid the foundation upon which the pathologist now relies in making his diagnosis." All the bodily tissues should, as they are taken up, be presented as potential cancer sites. A few examples of the way in which cancer cells grow will serve to make clear how normal growth passes directly over into that of the abnormal type without a perceptible borderland. The variation in degree of malignancy may be ascribed to differences in cellular growth potency. An excellent illustration of this kind is provided by the hypernephromata, which may well be introduced when discussing renal tissue.

A discussion of this kind sharpens the student's conception of the nature and significance of orderly restrained growth because it is contrasted with that of malignancy. He marvels that growth should, as a rule, be so orderly, and that malignancy should be the exception. He learns to associate malignancy with the loosening of restraint and the weakening of order promoting influences, usually linked with the decline into old age. He appreciates the meaning of the "cancer-zone" of life. He realizes that, if we save people from dying of other diseases by better medical treatment, hygiene and public health measures, we will have more at the end die of cancer. He is impressed by the stupendous fact that cancer accounts for one-tenth of all human deaths.

In this way the student early becomes "cancer-conscious." He begins to think productively on the subject and this good habit will likely grow and become increasingly useful in his pathologic and, later, clinical work. It will ultimately impel him to look for, and to find, the earlier manifestations of cancer in his patients. It may even stimulate him to attempt to pierce the gloom enveloping the origin of cancer.

But the histology teacher's enthusiasm should not lure him into the field of the neoplasms. He should merely refer to them in passing as

departures from the normal type of cell growth. He will do much to clarify normality in cell growth by throwing it into sharp relief against abnormality.

Preferred Sites of Cancer.—Useful correlations may be made with pathology, and also with clinical medicine and surgery, by referring to the histologic sites where cancer is most likely to occur. Not all tissues and regions show the same propensity toward cancerous degeneration; some tissues are much more unstable than others. This tissue susceptibility is, in essence, a histologic problem, and should be introduced early in the course. Only the more outstanding regions may be so presented, and in doing this, suitable charts may be employed.

For instance, one-half of all tumors occur in the gastro-intestinal tract. A chart disclosing the preference of cancer for the cardia, the pylorus and the rectum may be shown and the special cancerous tendencies of the epithelia of these regions noted when they are being studied in the organs concerned. In this way the student is trained to associate these regions with cancerous growth. The peculiarities of the parts concerned, as the transition in type of epithelium in the regions of the cardia and rectum, should be pointed out.

Similarly, a chart will make clear the special proclivities of the lip, tongue, tonsil and larynx to cancer, and the special histologic features of these sites should be explained, together with their liability to be affected by irritants of different kinds because of their exposed position.

Charts, too, of neoplasms in the male and female reproductive systems will demonstrate that in the male they occur by preference in the bladder, prostate, testis and tip of the penis; and, in the female, in the cervix and corpus uteri, and ovary. The fact that one-third of the tumors met with in practice develop in the uterus and breast is very impressive.

The student is, in this way, impelled to make himself familiar with the normal in these sites so that he will be able to discern the first evidence of abnormality, should opportunity for examination present itself. He will be stimulated, also, to learn about the associated signs and symptoms, and to realize the insidious nature of the first growth change of cancer. This makes for earlier diagnosis.

The Hereditary Factor in Cancer.—The opening thus afforded for the introduction of the cancer problem carries with it the great opportunity to point out the hereditary nature of cancer[96]. In this way, theoretical biologic study may be merged with the practical. When we emphasize the heredity factor in cancer we are not discounting the factor of chronic irritation. Indeed, we may point out that these two factors are to be considered as in inverse proportion to each other. If the hereditary factor be strong,

chronic irritation may be negligible for the production of cancer, and vice versa.

We may point out, in teaching the histology of the different tissues, that there is a tendency in families for the same type of tumor to occur at the same site in successive generations. For instance, in a case reported by Jüngling [26] there were three, and probably four, generations of polypoid growths of the rectum, and these were cancerous in the older members. In this family five members died of rectal carcinoma, and the last generation was too young to show malignancy.

Similar striking examples of inheritance in tumors may be cited while the histology of other organs, such as the stomach, uterus, ovary, breast, eye, nerves, etc., is being considered. Warthin's family G[26], in which there were four generations showing deaths from cancer of the stomach and uterus, is a case in point. The literature contains many similar examples, including instances of the rarer tumors also, such as choroidal sarcoma of the eye, and retinal and cerebellar angiomatosis.

Here we have evidence of hereditary tissue susceptibility or predisposition to tumor formation[27]; it is obviously an histological problem. These tumors are as much inherited as is eye color or any other physical peculiarity. When we consider that cancer tissue is developed from the body's own previously normal cells, and that these are subservient to hereditary laws, it does not seem reasonable to reject the factor of heredity in cancer. Some clinicians still seem to think that for a condition to be inherited it must appear at birth, whereas it need not do so until late in life.

Moreover, a knowledge of the hereditary nature of cancer is of great value to the practitioner, for it prompts him to look for the earliest signs of the disease at the sites where it has appeared in older members of that family. It thus favors earlier diagnosis and earlier operation, with increased chances of cure.[27]

Teaching Morbid Heredity.—This discussion naturally leads to the subject of the introduction into the histology course of the teaching of heredity in disease in general. There are many opportunities for teaching morbid heredity besides that afforded by the neoplasms. Many diseases are manifestations of inherited cellular defects, and these may occur at earlier or later periods of life. The protoplasm involved is defective, and this weakness is passed down from parent to child. Not only are there hereditary factors in the individual which condition the origin and development of the normal tissues, but there are also, of necessity, inherited factors which determine how any tissue shall react to its environment, some responding in one way, some in another; the tissues of some persons respond in a way very different from that exhibited by the same tissues in other

persons. Some tissues have a propensity to premature degeneration, others to malignant degeneration, while others are unduly vulnerable to certain micro-organisms. All of these peculiarities may be inherited. Hence, morbid heredity is of the most vital interest to the pathologist, and we are not surprised that it has already found its way into the courses of many of the leading teachers. Indeed, it is discussed in some of the textbooks on pathology, as in the recent one of Boyd[28]. It will ultimately become formulated into a special course in our leading medical schools[29], given in the senior year, after the student has gained a familiarity with human diseases[30]. It has a direct relation to public health[31]. One difficulty now is that few teachers are competent to teach it; and another that there is still much skepticism on the part of older clinicians as to its value. This attitude, however, is fortunately disappearing. Progress would probably be greater if the medical men were as fully convinced of the importance of heredity as are the well trained biologists. Too many practitioners only see the present generation. Few take the long view and interpret the present generation in the light of past generations; and fewer still are able to forecast the future from a knowledge of the past. We are learning, particularly in public health circles, to treat the race as well as the individual patient; to look to the health of future generations as well as to that of the present generation. There is great need for the eugenical outlook in medical education. In this connection the recent article of Lord Horder[32], in which he urges the inclusion of a course in the inheritance of human diseases in the medical school curriculum, even if it means the crowding out of material of lesser importance, is of great interest[33].

Thus, histology may be correlated closely with pathology through the science of heredity and its teaching. Since heredity is something inherent in the bodily tissues it is ultimately based on histology, so that it is singularly fitting that its earlier exposition should be carried on within the histology course. As an example of the way in which a hereditary disease may be introduced when considering the bodily tissues concerned with it, we may cite the teaching of the histology of blood and its relation to pernicious anemia. This disease has been shown to be hereditary; there is an inherited weakness in the hemopoietic tissue and possibly in other tissues, such as the gastric mucosa. While studying normal blood it serves to focus normality sharply in the student's mind to have it contrasted with abnormality as seen in the blood from a case of pernicious anemia, and with this a chart may be shown of a family history, exhibiting the occurrence of the disease in several generations of the same family. The leukemias are in the same class. By combining a number of aspects of blood in this way, the student's memory is aided rather than jaded. The

more frequently we present him with complete pictures, the more will we assist him to remember and the more will we interest him. The inculcation of an interest will accelerate the student's efforts, and get him into close grips with major problems at once. The postponement of practical applications tends to dampen the student's ardor and discourage his interest in medical problems. The more he can be brought to realize that the things he is learning have a direct bearing on his future medical work, the more progress will he make along profitable lines. Here, again, in pernicious anemia a knowledge of hereditary laws makes for early diagnosis, since it gives the "tip" to look for the signs of the incipient disease in near relatives of those who have already shown fullblown manifestations; and specific treatment, such as liver extract or ventriculin, may then be instituted. In this connection the work of Wilkinson and Brockbank[34] is significant, for they found early stages of pernicious anemia in near relatives of known victims by subjecting them to appropriate clinical study.

Again, when discussing the islets of Langerhans of the pancreas and the production of insulin, we may point out that diabetes shows a strong tendency to run in families. Poor quality of pancreatic islet tissue is inherited. Watson[35], in describing diabetes mellitus in both members of twins (of which there are now about twenty cases in the literature), remarks that, although this disease cannot be ascribed to a single cause, "there is undoubtedly a hereditary element operative in many cases." Here, too, as in many other conditions, a knowledge of the hereditary nature of the malady will aid the family physician to head off cases in near relatives. Surely, we owe it to medical students to make them aware of these facts.

Then, too, in considering the histology of the central nervous system, one has opportunity, while glancing at departures from the normal, to point out the hereditary nature of some of these lesions, as, for instance, the abiotrophies of the nervous system, exhibiting themselves in the great complex group of diseases differing in symptomatology as the abiotrophy is concerned with one or other of the various tracts or groups of nerve cells. But it is well also to emphasize that even where there is not present an apparent histologic abnormality, there are important functional derangements of the nervous system which are manifested in a number of types of mental disease of a hereditary nature.[36] The great increase in those suffering from hereditary mental defects in so-called civilized countries is fraught with menace for the future.[37] In surveying the increasingly costly, apparently futile and even pernicious efforts of well meaning people, in the modern hospitalization and "education" of such unprofitable elements of human society, and the wide-open opportunity afforded them to multiply at the expense of the fit but overburdened taxpayer, we are convinced of

the appropriateness of Osler's dictum: "In all things relating to disease, credulity remains a permanent fact, uninfluenced by civilization or education[38]". It would seem particularly true of mental disease.

Many other tissues could be mentioned in which inherited weaknesses manifest themselves in hereditary diseases; in fact, there is hardly a tissue which may not be implicated in some inherited ailment or abnormality. The evidence that tissue defects in man are hereditary must, of course, be deduced from the study of vital statistics, genealogies of twins, etc., but these methods are just as reliable as the chromosomal studies which are at the basis of the genetical generalizations on lower forms.

In discussing heredity in the histology course, it is always on the basis of cells and tissues which are hereditarily weakened, and whose defect is thus transmissible because the germ plasm has been affected. The student is thus early made to realize that tendencies to many diseases and degenerations are but evidences of inadequate functioning of hereditarily defective tissue.

In this way we give an incentive not only to the study of human heredity but also to submission to the governance of its inexorable laws. It is safe to say that the human race will never be truly emancipated, never be fully self-governing, until it understands the laws of human heredity and lives in accordance with them:

"To live by law:
Acting the law we live by without fear."

In recent years much progress has been made in human morbid heredity, particularly in Europe. Many American clinicians are well informed on the subject, and there has been much new information brought to light on this side of the Atlantic. There is a great need for institutes of human heredity, where inherited diseases can be studied specially. The investigation of human heredity is of much greater importance than many, perhaps than most, medical projects that call for the expenditure of large funds. Not a few medical executives are psychologically blind to the possibilities of an application of hereditary principles in medical practice because of their absorption in other subjects, such as surgical technic or immunity. Parenthetically, it may be remarked that not only is natural immunity inherited but even the ability to acquire an immunity is inherited in large measure. The medical profession is gradually shaking off its lethargy, and future generations will look back at this as the time when mankind threw off the chrysalis of preheredity ignorance. There is still an enormous amount of inertia to be overcome. The drag of the clinician who takes his point of view from decades back, and who feels that the course which produced him is sufficiently good for the modern medical student, is a great

handicap. The future is in the hands of the real prophets, as always. There is a challenge to the leading schools to be leaders in the teaching of medical heredity[39]. The populace, as a whole, is catching up with the profession in such matters—is even outstripping it in many cases—for with the increase in numbers of those who attend college and take courses in biology there has come a much greater dissemination of truth regarding heredity throughout the general population. This is having a good influence on the medical schools in many ways, and not least in inducing them to modernize their teaching of heredity in disease.

Aiding Pathologic Interpretations.—The expansions of modern histology have often led to more accurate pathologic interpretations. For instance, the recently developed histologic technic of direct observation of the functioning human capillaries at the base of the fingernail, has been of great value in the interpretation of pathologic conditions, such as the manifestations of urticaria, and the phenomena of surgical shock. Reference has been made to the distinction of normal functional from pathologic changes in the breast and uterus. The histologic technic which revealed the difference between the chromophobe and the chromophil cells and between the two types of chromophil cells in the hypophysis, enabled the pathologist to clear up the matter of hypophyseal tumors, and to explain, rationally, the association of some tumors with signs of hyperpituitarism, and of other tumors of the same organ with outspoken evidence of hypofunction of the gland.

Again, the silver technics devised by the Spanish school of neurohistologists, as well as other special histologic methods, have enabled the pathologist to unravel the complex matter of brain tumors[40], to assign them properly to their categories, and, still more important, to make more accurate prognoses as to the ultimate outcome than was possible under the older routine stains used for diagnostic purposes in pathology. Here, again, the growth potencies of cells, as mentioned in the section dealing with cancer, may be emphasized. Because these technics enable the pathologist to determine whether the tumor of the brain is arising from an undifferentiated embryonic cell type, with its growth potentialities still intact, or from a mature cell type, with its growth capacities much diminished, he is able to predict its degree of malignancy.

Another striking advance in pathologic interpretation based on newer histologic methods is in the realm of the reticulo-endothelial system, already discussed under the connective tissues. The proliferative and defense reactions of its phagocytic cells in chronic inflammations, such as tuberculosis, is now well recognized, although the origin of the tubercle from this system was not so clearly understood at first[41]. The appreciation of the

part played by this system in the production of bile pigment is a matter of the last few years, and the same may be said of its rôle in the production of antibodies, antitoxins, precipitins, etc. Its phagocytic rôle, the engulfing of particles in the blood stream, was the first to be discovered, since it was that activity which caused the visibility of its cells to be so much increased through the ingestion of vital dye particles and the segregation of them in minute collections within the cytoplasm. Finally, the ability of these cells to take in and store particulate matter accounts for their fat-laden appearance in the lipemia of diabetes. The same propensity to store is evidenced in Gaucher's and Niemann-Pick's disease, in which the reticulo-endothelial cells segregate the incompletely disintegrated products of fats which are circulating in the blood stream.

Lane's differential staining of the alpha and beta cells of the pancreatic islets, and the subsequent demonstration of the disappearance of the secretory granules in the beta cells in diabetes, enabled the pathologist to discover an islet lesion in diabetes, whereas, before this technic was introduced, it was not always possible to discern a pathologic basis, despite outspoken clinical symptoms. The technic of demonstrating glycogen in liver cells gives the pathologist the key to the explanation of Von Gierke's disease. These are typical examples of histopathologic teamwork which may be given prominence in the histology course.

In the intestinal epithelium the argentaffine or enterochromaffine cells, now emerging out of darkness into light, are definitely related to the carcinoids, as those of the appendix[42]. Histologic research has recently shown that the separation of the epithelium of the intestinal villus from its connective tissue core, though it is sometimes caused by the immersion of the freshly opened intestine in unsuitable fixatives, occurs automatically from contraction of the smooth muscle following cessation of the circulation even before fixation, and does not represent a stage of absorption as was formerly supposed[43]. Thus we have an explanation of the curious epithelial caps and rings seen in sections of the intestine in necropsy material. In the respiratory system a functional interpretation of the histology of the bronchi[44] shows that these tubes are built for length and width changes, and X-ray research has confirmed these movements[45] which are of vital interest to the pathologist in connection with bronchiectasis[46] and many other conditions. The histopathology of the meninges and choroid plexus explains much of hydrocephalus[47]. In the skin, a deficiency in elastic tissue has been shown to be associated with epidermolysis bullosa. In the intestinal mucosa, Ballantyne[48] has sharpened the distinction between mast cells and plasma cells. The freezing-drying method in the hands of Bensley[49] has reassured us regarding the reliability of the appearance of

Nissl substance and other basophil cytoplasmic material in nerve cells[50] and has already contributed valuable new information on the chemical and physical nature of mitochondria[51]. It promises much for the future. The work of Wray Lloyd[52] has thrown new light on the auriculo-ventricular bundle and its functional significance.

Space will not permit of more than a brief mention of the enormous amount of new histopathologic data on the nervous system, which now has assumed such dimensions as to demand the sole attention of specialists. The neuropathologist relies on fundamental work such as that of Miller[53] on the transmission of pain and other impulses. New work on important details of the circulatory system has been contributed, as that of Knisely[54], who has made clear the mode of passage of blood through the spleen. Roentgenography has contributed much of interest to histologist and pathologist alike, both in the study of positional and dimensional details of organs, such as the lungs[55], and in experimental radiation of cells. These examples could be multiplied indefinitely.

Foreshadowed Correlations. — Many histopathologic linkages are already suggested without being actually established. For instance, the interalveolar pores of the lung are regarded as safety valves against atelectasis, on the one hand, and hyperdistention, on the other, when the supplying airtube is plugged[56], and, possibly, they constitute a pathway for the peripheral spread, through the lung tissue, of infections. Perhaps the frequent stirring up of the endometrium and the mammary parenchyma[57] during the menstrual cycle predisposes to cancer in individuals in whom these sites have a heightened tendency to malignant degeneration. In the thyroid the normal of variability has not yet been well established, and new leads into the pathologic field may well be expected. In the kidney, the arrangement of the blood vessels, harking back to the old renal portal system, indicates that the tubules are supplied with blood which has already passed through the capillary network of the glomerulus[58], and this may be shown to have a specific relation to the nephritides. Accurate data on the volume of organs with relation to body weight or age will grow in value to pathologists. Smith[59], for instance, has found that the volume of the cerebral cortex shows considerable variation among individuals of the same age, and remarks that "The volume of the cortex is constant neither absolutely nor relatively to total brain volume among individuals of the same age." The future will yield a rich harvest of such data for the use of the pathologist. It is the duty of the histologist to open up as many of these vistas as possible in passing.

Methods.—Such correlations can be constantly made in lectures and laboratory conferences without the expenditure of much time. The exhi-

bition of a few pathologic specimens, both gross and microscopic, in the laboratory is very helpful. Abundant references to scientific journals should be given, and each student should have the opportunity of conveying orally to the class the gist of at least one such article during the course. The discussions afford abundant opportunity for making such correlations. Students become enthusiastic in these exercises and profit greatly from them. The questionnaire method is of service. A list of questions suggesting pathologic applications may be mimeographed and distributed, and the answers discussed by the class as a whole or in groups. Library references may be given. It is of the greatest importance that the medical student should learn to love good scientific literature. It is safe to say that if he does not gain this affection during his course in the medical school he is not likely to do so afterward. He will gain this if he finds reading pleasant and helpful, and particularly if he has the impetus of association with his fellows similarly engaged. The more real joy we can put into our courses the better.

Patients, too, may be shown if the hospital is conveniently located and suitable arrangements can be made. A host of examples will occur to the reader; as, following a presentation of the myocardium and cardiac valves, patients showing derangements of these structures are exhibited, together with suitable gross and microscopic preparations. Only a few examples will suffice to grip the imagination of the student and accelerate his study-speed. The patient becomes reduced to his lowest terms as an aggregation of minute living elements—cells—whose structure and function are profoundly altered in disease.

Pathology; An Appreciation.—All this, it is felt, will make the histology course more useful and enjoyable. It should also be of service to the pathologist, and anything that can aid in the teaching of pathology is in the interest of medical education. It would be entirely out of place here to dwell on the importance of pathology in the medical course. It is, as Flexner[60] has so well put it, "The strong corner stone of modern medicine." Without it we would have mere empiricism. A medical school cannot rise higher than the level of its teaching of pathology. It is the focal point—the confluence—where the streams of the preclinical sciences are applied and from which they diverge to vivify the various clinical sciences. Dean of Cambridge "has rightly called pathology the bridge which spans the gap between the pure medical sciences and the clinical side of things[61]". Changing the metaphor yet again, it may well be called the hinge around which the medical course rotates, for in the pathology department the practical turns on the theoretical. Close correlation between histology and pathology must, therefore, be of advantage to both and of disadvantage to neither;

and leads of the sort herein described should give the student an impetus which will carry him far into the domain of pathology.

Time Sequence.—I regard it of great importance that the course in pathology should follow immediately on that in normal histology. The student should be led directly from the one into the other. The momentum toward the pathologic field which the student has acquired from his series of previews into it should not be allowed to die down through the lapse of a long interval of time between the courses. Close juxtaposition makes clear the student's objective while he is studying histology, and so increases his efficiency. The histologic and pathologic staffs should be in close touch with each other, and frequent conferences should take place. The course in bacteriology may well be taken synchronously with histology, and many useful correlations can be made between the two, all the way along, as in demonstrating bacteriophagic reactions, or the propensity of special epithelial areas, as the nasal mucosa, to bacterial invasion.[62]

It may be objected that, if all departments of the medical school attempted to correlate their special subjects with each other there would be much duplication and loss of time, to say nothing of possible friction. This, I feel, will not happen if due moderation be exercised. Seeing the same thing from different angles, as a rule, increases our understanding of it, and there is a pedagogic value in repetition—in summation of stimuli—if due regard be given to freshness and variety.

We owe it to the student to keep all our courses up to date, and the foregoing suggestions are attempts in this direction. They may be multiplied almost *ad infinitum*. Pathologists who read this paper will doubtless think that I have left out most of the instances as the tissue reactions in tuberculosis, syphilis or pneumonia. I have merely attempted to indicate major trends. I am in deepest sympathy with the ideals of Sabin[63] about teaching histology in its "growing zone," and it seems to me that from this many living tendrils lead directly into the pathological field. Wherever it is possible to make a pathological application I do so. If the teacher has imagination, enthusiasm, an understanding of what he is teaching, and a proper sense of balance, correlations of this type can be made profitably. The broadening of histology courses to meet modern medical needs will necessitate better provision for the teaching of histology by governing boards. Doubtless changes in the curriculum must be made; but the curriculum will continue to change as long as medicine progresses, and medicine will progress just so long as productive research is carried on.

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A Course in Cancer*

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There exists an affiliation between the Memorial Hospital and the Cornell University which enables the faculty of the Medical College of the latter institution to offer its fourth year students a four weeks course in cancer at the Memorial Hospital.

The Memorial Hospital is not organized as a teaching institution. It is primarily a therapeutic and research institute for cancer. In this course there is, therefore, but little time for formal teaching. The method employed is, perhaps, the best possible; namely, direct contact with the teachers while they are examining and treating the patients. As not more than two students are with an instructor, the contact with him and with the patient is intimate. This method approximates the relationship between the master and the apprentice.

Four weeks is a very short time; nevertheless, it is astonishing how much basic knowledge of cancer can be assimilated by alert students. The course is given every month of the academic year. A new group of students commence the course every four weeks. The present system of instruction was introduced in October, 1934. Sufficient experience has been gained to estimate its value.

The aim is to make these future practitioners "cancer conscious" in their diagnostic work; to make them realize that prognosis frequently depends on the finer points in diagnosis. The exact diagnosis, which determines adequate treatment, is the work of specialists trained by years of experience with an abundance of material.

At the end of the four weeks, the student's mind is relieved of the impression that cancer is a hopeless disease, in which the patient is doomed to die,—the sooner the better! He has perceived that amazing results may be accomplished by the timely cooperation of the apperceptive practitioner and the highly skilled specialist. In striking contrast are the hopeless situations actually created by dilatoriness of the patient or of the attending physician. It is not an objective of this course to make these students capable of treating cancer adequately, except in association with specialists in this field.

The student is placed in a position where he can watch, yet mingle with the vast parade of cancer patients in the clinics. A schedule has been prepared which is offered to the student as a guide to the profitable use of

*Given at the Memorial Hospital of the City of New York for the students of Cornell University Medical College, 1934-1935.

TABLE 1. PARTITION OF TIME ACCORDING TO SUBJECTS AND WEEKS.

Week: (hours)	1st.	2nd	3rd	4th	Totals
BASAL					
Radiology	5½				5½
Roentgenology	4½				4½
Pathology	11½	12	8	11	42½
(Sub-total)	21½	12	8	11	52½
GENERAL					
Staff Conference	2	2	2	2	8
Exam. New Patients		6	6		12
Asp. Biop. Tech.	2				2
Cancer and Sepsis			1		1
(Sub-total)	4	8	9	2	23
DEPARTMENTAL					
Breast:					7
Clinic	3				
Lecture	1				
Operations	3				
Mixed:					3
Clinic	2				
Lecture		1			
Bone:					5
Clinic	2		2		
Lecture	1				
Medical:					3
Clinic		2			
Lecture		1			
Rectal:					3
Clinic		2			
Lecture		1			
Gastric:					3
Clinic		3			
Gynecology:					5
Lecture		1			
Operations		4			
Urological:					4
Clinic			3		
Lecture			1		
Intra-Oral:					8
Clinic			2		
Dental			1		
Lecture			1		
Operations			2		
Esophagoscopy			2		
(Sub-total)	12	15	14		41
ELECTIVE		2½	4½	24½	31½
RESEARCH					
Lecture			1		1
Seminar			1		1
(Sub-total)			2		2
TOTALS	37½	37½	37½	37½	150

his time. It provides for 150 hours of instruction; but it is possible for him to secure 180 hours. Emphasis has been placed on subjects and material not met in the undergraduate course, and not likely to be encountered in the internship; for instance, irradiation therapy in all its branches.

About 5,000 patients apply for treatment annually at the Memorial Hospital. About 1,500 must be denied treatment, either because an examination has not revealed cancer, or has revealed one too far advanced for treatment here. Thus, the 3,500 new patients, added to those already under treatment, furnish an amount of tumor material which may never be available to the student again. It has been estimated that there are only enough cancer cases in a populous New England state to allow each physician to see two cases a year. So, the large number of patients is a major factor in accomplishing the aim of this course.

The schedule is designed to enable the student to study this material to the best advantage. The first three weeks insure that he has covered the field by participation in all the clinics. The fourth week is free from direction. The student may elect work in any department.

In this hospital, in order to expedite diagnosis and treatment, all of oncology is apportioned between nine clinical departments, which are:

1. Breast tumor department.
2. Bone department.
3. Gastric clinic.
4. Gynecologic department.
5. Intra-oral department.
6. Medical department.
7. Mixed tumor department.
8. Rectal department.
9. Urologic department.

About seventy (including electives) of the 150 hours are devoted to these departments. A relatively greater amount of time is spent in the departments of pathology and radiology than in any other department. A knowledge of these subjects is essential to an understanding of the nature, prognosis and treatment of the myriad forms of cancer.

Now, let us follow the student through the course. He arrives with his microscope, which is kept in the round table located in the Museum, next to the pathological laboratories and the library. From here we commence a quick tour of the institution, comprising the Memorial Hospital and the Douglas Research Laboratories. This orients the student and gives an idea of the scope of our functions. The tour ends in the outpatient department of the hospital where the breast tumor clinic is in progress. About 125 patients attend this clinic. At noon there is a lecture by Dr. Frank E. Adair on the diagnosis and treatment of breast tumors.

The lectures are informally given at the round table in the Museum. They are usually illustrated by lantern slides; and frequently by gross specimens close at hand in the Museum. The recognition of precancerous states, and the treatment of conditions in which irradiation is of unique or major value is stressed.

After the lecture, the students lunch in the hospital. Part of the noon hour may be spent in the pathology department studying the day's slides and the gross material received from the operating rooms.

In the afternoon, the students attend the mixed service clinic in which about thirty cases of neurogenic, lipogenic and myogenic sarcoma, melanoma and other tumors of the trunk and extremities are treated. Dr. George T. Pack's lecture is on melanoma.

There is a lecture on irradiation terminology and a demonstration of instruments employed in applying radon. The radon collection apparatus is observed in action. The method of capturing and confining the gas given off by 4 grams of radium in solution is explained. The instruments used for the measurement of the strength of the gold filtered radon tubes is demonstrated.

Dr. Ralph E. Herendeen gives a lecture on the therapeutic use of the roentgen rays, emphasizing the fields in which it is most useful. The main theories and practice in roentgenotherapy are described. Films are shown which illustrate the efficacy of this treatment in certain conditions, including palliation in advanced stages.

Dr. James J. Duffy talks on the use of the gamma rays and demonstrates the use of 4 grams of radium element set up for therapeutic use. His lecture covers the clinical application of the physics of irradiation. Some time is spent in observing the "set-ups" in roentgenotherapy.

Thus, sufficient instruction in radiology is imparted during the first week to be of service throughout the course. The work in the other departments adds to this knowledge.

The technic of aspiration biopsy is demonstrated. The staining of these smears is taught. A lecture, illustrated by lantern slides, is given on the diagnosis of these smears. A hundred proven smears are studied. There is daily practice in the interpretation of aspiration biopsy smears as we make about 2,500 a year.

In the clinic on bone sarcoma, by Dr. Bradley L. Coley, the student has two sessions. About thirty-five cases are seen, together with the radiographs. There follows a lecture covering the field of bone tumors. In the Museum there are 200 mounted gross specimens illustrating all types of bone tumors.

Forty-two of the 150 hours are spent in studying the pathology of

cancer. The material available consists of the large amount of tumor material of this hospital, as well as many sections sent here for diagnosis. Each day the current gross and microscopic specimens are placed at the disposal of the student for study. The plan is to emphasize the importance of being able to recognize cancer in the gross. The student studies as much fresh gross material as possible. The gross specimens of the museum are accompanied by full microscopic and clinical data in each case.

In microscopic work, the Ewing Tumor Collection of 5,000 sections is used. Also, there is a collection of slides arranged according to organ, and within the organ, according to the degree of anaplasia. Most of the time is spent studying the sections, however, there are a few illustrated lectures on tumor grading and histogenesis.

Dr. Ewing's lecture furnishes the student with the criteria by which he should judge the relation of trauma to cancer, a question which is certain to recur repeatedly in his practice.

In the second week, the students assist at the examination of new patients. Unsuitable material is referred elsewhere. Accepted cases are diagnosed and referred to the proper clinic of this hospital for treatment.

Dr. George E. Binkley's rectal tumor clinic (about twenty-five cases) and Dr. Benjamin Barringer's urologic clinic (about thirty cases) are made fruitful for the students in spite of the handicap of observation through instruments. There is a lecture in each subject in which the value of irradiation in these fields is stressed.

In gynecology, Dr. William P. Healy receives the students at an operative session, where they observe the combined use of irradiation and surgery. Between operations, the principles and procedures are commented on, and questions are answered. In his lecture, Dr. Healy brings out the importance of the histologic grading in relation to prognosis. He cites end results in carcinoma of the cervix which indicate that irradiation therapy is the most successful.

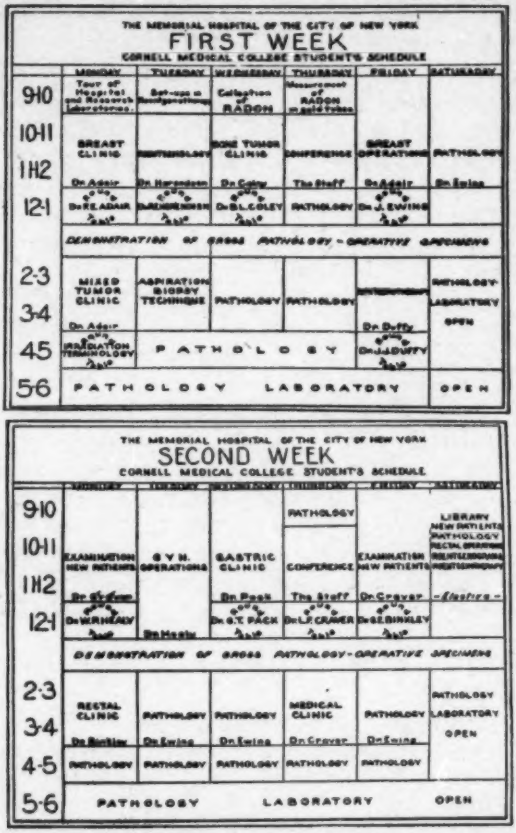
An afternoon is spent in the medical clinic of Dr. Lloyd F. Craver, where such diseases as carcinoma of the lung, Hodgkin's disease, lymphosarcoma and leukemia are seen. A lecture is given covering this field.

Intra-oral cancer and its precancerous states are presented by Dr. Hayes E. Martin in an abundantly illustrated lecture. The actual lesions are seen in his clinic (about 125 cases). A session is devoted to the examination of patients with the esophagoscope.

A morning is spent with Dr. Pack in the gastric clinic. Every Thursday, from 11 a. m. to 1 p. m., the staff of the hospital holds a conference. This is attended by the students and by many practitioners of the metropolitan area. Approximately ten cases are presented either as problems in diagnosis, or as instructive results of treatment. Gross pathologic material

from recent autopsies is presented by Dr. Ewing or Dr. Stewart. Frequently, the research staff contributes a report on some of its studies of clinical interest.

Research in cancer is presented in a lecture by Dr. H. D. Bagg. Current significant research in this institution along biological and en-



THE MEMORIAL HOSPITAL OF THE CITY OF NEW YORK
FIRST WEEK
CORNELL MEDICAL COLLEGE STUDENT'S SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9-10	Tour of Hospital and Research Laboratories	Services in Roentgenotherapy	Collection of RADON	Measurement of RADON in gold tubes		
10-11	BREAST CLINIC	HISTOLOGY	BONE TUMOR CLINIC	CONFERENCE	BREAST OPERATIONS	PATHOLOGY
11-12	Dr Adair	Dr Henderson	Dr Coley	The Staff	Dr Adair	Dr Ewing
12-1	Dr F.E. ADAIR	Dr. HENDERSON	Dr B.L. COLEY	PATHOLOGY	Dr J. EWING	
	DEMONSTRATION OF GROSS PATHOLOGY - OPERATIVE SPECIMENS					
2-3	MIXED TUMOR CLINIC	ASPIRATION BIOPSY TECHNIQUE	PATHOLOGY	PATHOLOGY		PATHOLOGY LABORATORY OPEN
3-4	Dr Adair				Dr Duffy	
4-5	IRRADIATION TERMINOLOGY	PATHOLOGY			Dr J. DUFFY	
5-6	PATHOLOGY LABORATORY					OPEN

THE MEMORIAL HOSPITAL OF THE CITY OF NEW YORK
SECOND WEEK
CORNELL MEDICAL COLLEGE STUDENT'S SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9-10				PATHOLOGY		LIBRARY NEW PATIENTS PATHOLOGY RECTAL OPERATIONS RELATIVE SPECIFIC MEETS WITH
10-11	EXAMINATION NEW PATIENTS	G.Y.N. OPERATIONS	GASTRIC CLINIC	CONFERENCE	EXAMINATION NEW PATIENTS	
11-12	Dr [illegible]		Dr Pack	The Staff	Dr Craver	Electives
12-1	Dr WERNICKE	Dr Healy	Dr G.T. PACK	Dr L.F. CRAMER	Dr G.E. BINKLEY	
	DEMONSTRATION OF GROSS PATHOLOGY - OPERATIVE SPECIMENS					
2-3	RECTAL CLINIC	PATHOLOGY	PATHOLOGY	MEDICAL CLINIC	PATHOLOGY	PATHOLOGY LABORATORY OPEN
3-4	Dr Buntley	Dr Ewing	Dr Ewing	Dr Craver	Dr Ewing	
4-5	PATHOLOGY	PATHOLOGY	PATHOLOGY	PATHOLOGY	PATHOLOGY	
5-6	PATHOLOGY LABORATORY					OPEN

FIGURE 1. CURRICULUM FOR FIRST TWO WEEKS STUDY OF CANCER.

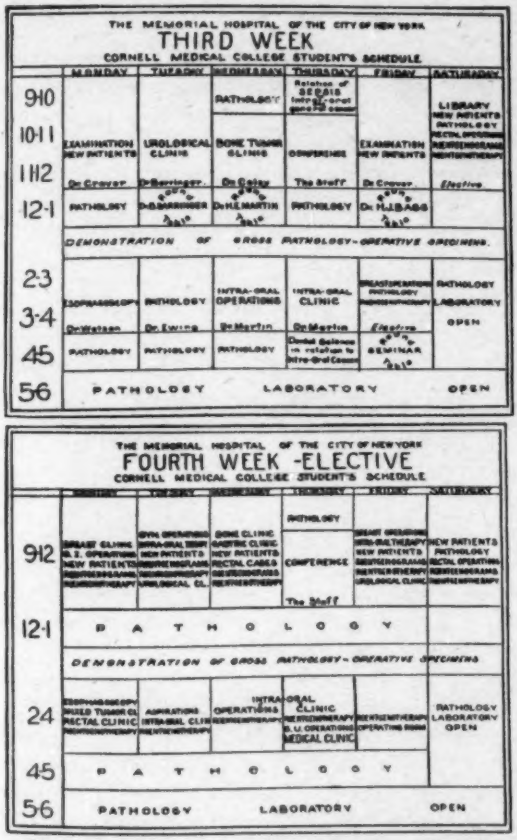
docrinologic lines is brought to the student's attention. The students attend the monthly meeting of the research staff, called the Seminar, where papers are presented on their current work.

The following are recommended for reading during the course:

Causation, Diagnosis and Treatment of Cancer by James Ewing, M. D. This is the Beaumont Foundation Lecture published by the Williams &

Wilkins Company of Baltimore, Md., for the Wayne County Medical Society, Detroit, Mich., 1931.

Lectures of Tumor Pathology delivered by James Ewing, M. D., to the Class of 1934 of the Cornell University Medical School; and published by that class.



THE MEMORIAL HOSPITAL OF THE CITY OF NEW YORK
THIRD WEEK
CORNELL MEDICAL COLLEGE STUDENT'S SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9-10			PATHOLOGY	Relation of SEDIS Intra-Oral Cancer to Cancer		LIBRARY NEW PATIENTS PATHOLOGY RECTAL OPERATIONS
10-11	EXAMINATION NEW PATIENTS	UROLOGICAL CLINIC	BONE TUMOR CLINIC	CONFERENCE	EXAMINATION NEW PATIENTS	
11-12	Dr. Crowell	Dr. Berringer	Dr. Coley	The Staff	Dr. Crowell	Elective
12-1	PATHOLOGY	Dr. A. Bainbridge	Dr. H. L. Martin	PATHOLOGY	Dr. H. L. Bagg	
	DEMONSTRATION OF GROSS PATHOLOGY - OPERATIVE SPECIMENS.					
2-3						PATHOLOGY LABORATORY OPEN
3-4	Dr. Watson	Dr. Ewing	Dr. Martin	Dr. Martin	Elective	
4-5	PATHOLOGY	PATHOLOGY	PATHOLOGY		SEMINAR	
5-6	PATHOLOGY LABORATORY OPEN					

THE MEMORIAL HOSPITAL OF THE CITY OF NEW YORK
FOURTH WEEK - ELECTIVE
CORNELL MEDICAL COLLEGE STUDENT'S SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9-12	BREAST CLINIC		BONE CLINIC GASTRIC CLINIC NEW PATIENTS RECTAL CASES	PATHOLOGY CONFERENCE The Staff		NEW PATIENTS PATHOLOGY RECTAL OPERATIONS
12-1	P A T H O L O G Y					
	DEMONSTRATION OF GROSS PATHOLOGY - OPERATIVE SPECIMENS					
2-4			INTRA-ORAL OPERATIONS	INTRA-ORAL CLINIC MEDICAL CLINIC		PATHOLOGY LABORATORY OPEN
4-5	P A T H O L O G Y					
5-6	PATHOLOGY LABORATORY OPEN					

FIGURE 2. CURRICULUM FOR THIRD AND FOURTH WEEKS.

On the round table there is a copy of Ewing's *Neoplastic Diseases* available for reference; also a bound volume of selected reprints dealing with tumor pathology; including Masson's paper on Pigmented nevi and Melanoma and the papers of Broders and others on the grading of tumors. In the library all the important journals and many books in the field of oncology are available.

A New Method of Teaching Physical Diagnosis*

JULIAN M. RUFFIN
Durham, N. C.

In many medical schools, physical diagnosis is regarded as a subject of minor importance and occupies the unenviable position of a course distasteful to faculty and student alike. Generally, it is given in the last half of the second year, being wedged in between such major subjects as pathology and physiology. The assigned hours, which are all too few, usually are begrudged by other departments, and the actual teaching, instead of by the best whom the school can afford, frequently is relegated to instructors or even to the intern staff.

It can hardly be denied that the art of history taking and the ability to make an exact, complete physical examination are the greatest assets that any man engaged in the practice of medicine has, be he general practitioner or specialist. It is unfortunate, indeed, that instruction in these fundamental subjects so frequently is neglected. How often do we see those best qualified to teach meet the class once or twice and then pass the burden of the course to younger shoulders, frequently too inexperienced to carry it well!

As a rule, the course is taught entirely by the medical department, and, naturally, the examination of the chest occupies the center of the stage, so much so that one of our outstanding textbooks is entitled, "Diseases of the Chest and the Principles of Physical Diagnosis," implying that an examination begins and ends with the chest. The result of such training is reflected by certain internists who concern themselves primarily with the heart and lungs, paying little attention to the remainder of the body. In an effort to stress the importance of the examination of every part of the body, as well as to relieve the medical department of the ever increasing burden of furnishing sufficient instructors to teach the course well, the staff in each clinical department participate in teaching the subject, and the following plan of instruction was adopted at Duke University School of Medicine in 1932.

The course is given in the winter quarter of the second year and a total of 126 hours is devoted to this subject, including both lecture periods and practical demonstrations. The class is divided into six sections of from eight to ten students per section. The actual teaching is conducted by the

*From the Department of Medicine, Duke University School of Medicine, Durham, N. C.

entire clinical staff, and the assigned hours are divided among the various departments as follows:[1]

Medicine:	14 one hour lecture periods	14 hours
	13 two hour periods (in sections)	26 hours
Neurology and Psychiatry:	8 two hour periods (in sections)	16 hours
Surgery:	5 one hour lecture periods	5 hours
	3 two hour periods (in sections)	6 hours
Urology:	2 one hour lecture periods	2 hours
	2 two hour periods (in sections)	4 hours
Orthopedics:	3 one hour lecture periods	3 hours
	2 two hour periods (in sections)	4 hours
Otolaryngology:	3 one hour lecture periods	3 hours
	2 two hour periods (in sections)	4 hours
Obstetrics and Gynecology:	5 one hour lecture periods	5 hours
	6 two hour periods (in sections)	12 hours
Ophthalmology:	2 one hour lecture periods	2 hours
	2 two hour periods (in sections)	4 hours
Dentistry:	1 one hour lecture period	1 hour
	1 two hour period (in sections)	2 hours
Pediatrics:	1 one hour lecture period	1 hour
	4 two hour periods (in sections)	8 hours
Roentgenology:	4 one hour periods (in sections)	4 hours
	TOTAL:	126 hours

In the lectures, which are held for the whole class, the student receives formal instruction in taking histories and in the examination of whatever part of the body is under consideration, and in the sections he is taught by practical experience to familiarize himself, first, with the normal and, later, with the more common pathologic conditions of the various parts of the body. In this manner, the examination of the entire body is taught by those best qualified to do so. Furthermore, the course serves as an introduction to clinical medicine. The student not only has the usual instructions in methods of physical examination, but also is taught the elementary principles of the various specialties. Thus, the abrupt transition from preclinical to clinical work is somewhat modified and the student is not so completely bewildered when he is assigned ward work for the first time.

1. The amount of time spent by the staff of each department is, of course, much greater than that indicated, as the number of hours must be multiplied by the number of sections. For example, the actual teaching hours of the medical department are 170 (14 one hour lectures and 13 two hour periods for each of six sections).

This system has been used here for the past three years with apparently satisfactory results. Trained by all clinical departments, these students adapt themselves to the various problems which arise in ward and dispensary work much more quickly than do those who have been taught physical diagnosis by the medical department alone. They are familiar with the facts to be elicited in a pediatric, obstetric and psychiatric, as well as in a medical history. They have been taught the methods of examination of each specialty. They can use an ophthalmoscope and otoscope as well as a stethoscope. They can palpate abdomens, and make pelvic and rectal examinations, as well as percuss chests.

It should be pointed out clearly that while all the clinical departments participate in teaching the course, the general supervision and ultimate responsibility must revert to the medical department. For in the last analysis, it is the duty of the medical department to see that students learn to examine the patient as a whole and not center their attention on any one part of the body. Great care must be taken to emphasize the necessity of correlating all the facts obtained from a carefully taken history, from a complete examination, and from various laboratory procedures, in an effort to arrive at a correct diagnosis.

This method of teaching physical diagnosis can be used readily in most, if not all, medical schools, without additional expense, by requesting the assistance of all the clinical departments, thereby giving the student such thorough instruction in the fundamentals of history taking and physical examination that he will be better equipped to assume his duties on the ward and in after life the responsibilities of general practice.

Discrepancies of Etiology in Ten Medical Textbooks Now Used at Syracuse University*

R. CUMMING ROBB
Senior in Medicine, Syracuse University
Syracuse, New York

The discoveries of Pasteur and Koch only fifty years ago released us from belief in witchcraft and black vapours, and gave birth to the science of etiology. To this firm basis we owe the brilliant rise of preventive medicine, which has closed our typhoid wards and may yet empty our contagious disease hospitals. The newest and least familiar branch of etiology is medical genetics, and its growing prominence in modern textbooks is highly significant.

In view of the fact that none of the authors (of ten outstanding textbooks now used at the Syracuse University College of Medicine) ever attended a course in genetics, their modern writings are remarkably sound. Moreover, during the past five years, errors of fact are rapidly disappearing, although ommissions and misinterpretations abound. For example, the ninth edition of Holt's Pediatrics (1926) states that the disease most commonly transmitted by heredity was syphilis; the tenth edition achieved a flawless discussion of sex-linked inheritance in hemophilia. (This is the mechanism operating in most types of glaucoma, optic nerve atrophy, ichthyosis, color-blindness, etc.).

Likewise, in 1929, DeLee's Obstetrics showed unfamiliarity with the X-Y chromosomes determining sex, a subject concerning which the expectant mother really should not be better informed than her physician. However, in their later editions both Williams and DeLee recognize germinal defects as being largely responsible for prenatal deaths (regarding the etiology of which many extraordinary statements have been offered to patients in the past). Similarly, W. G. MacCallum now condemns the term "hereditary syphilis" and describes sickle-cell anemia as being a mendelian dominant. Ripe in experience, having seen the fall of many theories, Miller is unconvinced, and neither Cunningham nor Homans commit themselves on the etiology of congenital anomalies. Wechsler is exceptionally well informed, but Rosenau alone approaches the inheritance of disease in a systematic fashion. Because medical teaching has been so uneven in this respect, a special seminar course is given to acquaint seniors at Syracuse with the sources of disease in the home.

In general, the medical author does not give due credit to recessive

*Read before the annual meeting of the American Association for the Advancement of Science, held in Pittsburgh, Pennsylvania, December 27, 1934.

genes in etiology, despite a recent award of the Nobel Prize in Medicine to Thomas Hunt Morgan for his discovery of the gene. Thus Ordway (in Cecil's Medicine) maintains that "leukemia is familial, but heredity is not a factor in its etiology." Similarly, Wechsler describes Wilson's disease as a "chronic, progressive, fatal disease, usually familial, but neither congenital nor hereditary." Such definitions fall strangely on the ears of a geneticist, who expects the recessive conditions to crop up on the family tree only when transmitted simultaneously from both parents. The ubiquitous label "familial but not hereditary" is a clinical term used to convey the fact that neither parent was obviously involved; but we know that one was a carrier, although as asymptomatic as "typhoid Mary." Hence, that label implies ignorance of the most common mode of inheritance.

Lethal and semilethal factors are rarely identified, although semilethals alone were responsible for 13 per cent of infant deaths in 1929, in striking contrast to 1.5 per cent forty years ago (data calculated from figures given in Holt). Lethal genes cause death at any time before term. The above statistics represent postnatal causes only, such as hydrocephalus, spina bifida, pyloric stenosis, imperforate digestive tract, cretinism, mongolism, etc., together with the large class of "congenital anomalies." Cleft palate, diabetes mellitus and achondroplasia are semilethal in animals, although too often viable in man. Many more conditions, including specific neoplasms, hernia and vascular disorders reduce viability, but at a later age, so are not classified as semilethals.

The behavior of allelomorphs (alternates) is not generally appreciated in medical writings, although not to be ignored. It must be remembered that any given genetic condition is dominant to its chemically less potent alternate but asymptomatic in the presence of its more potent alternate. Only by comprehending this mechanism could one realize that, for example, a mating between parents of blood groups I and IV can produce offspring in groups II and III, but none that resemble either parent. When advising the laboratory technician where to seek for donors, such information might eliminate numerous unnecessary tests.

While preventive medicine is eliminating diverse infectious diseases, hereditary disorders are making increasing demands on society. Already, the state of New York expends annually about thirty million dollars for the care of its defective brains, most of which are not luetic in origin. If there are reserved in the entire country as many hospital beds for mental disorders and defects as for other conditions combined (whether or not we concede that dementia praecox, manic-depressive insanity and involution psychoses are demonstrably of hereditary etiology), the increasing importance of medical genetics to the physician must be granted.

It is not necessary that the medical student be conversant in every phase of medicine, nor is it possible. Yet, as the future custodian of public health he may be asked which diseases are inevitable, and which marriages are surely destined to be blighted by deformed and sickly offspring. Not even the vocabulary of this type of preventive medicine is included in our curriculum.

The Foundation of Medicine*

LOUIS RENE KAUFMAN
Professor of Urology, New York Homeopathic Medical College
New York City

Dislocation of established social values in our modern complex civilization profoundly affecting the medical profession produce bewildering and, at the same time, very serious doubt of the solidity of our institutions. The currents of life flow fast, and we live today more and longer in one year than previous generations did in a decade. Professional and technical knowledge grows by leaps and bounds, gaining momentum and tapping forever new sources from its accumulating storehouses. One may well, therefore, inquire into the fundamental value of all these forces creating new and changing conceptions, all of which must, nevertheless, have at least implied some more or less substantial basis.

What is the foundation of medicine? Webster's dictionary defines foundation in part as: "the basis or lowest part of a structure; groundwork; the principles or origin of anything," so that what we are discussing is the fundamental basis of medicine. It springs from a long historical evolution stretching through generations into the ancient priesthood of primitive people. No matter how filled with change, unsettlement and innovation the present may seem to be, this fundamental basis bears a proper relationship to the past which, at least in perspective, seems always defined and settled and to the future dimly perceived beyond our ken. What are the elements of this foundation? There are, broadly, four elements which may be classified as:

1. Personal, or having to do with character.
2. Cultural, as related to general education and intellectual capacity.
3. Technical, or knowledge acquired expertly through years of study in the vast field of medicine and its kindred allied sciences.
4. Social, or the public aspect of medicine.

*A lecture delivered to the junior and senior students in the general extra-curriculum program on "Cultural Medicine."

Professional knowledge always connotes the practice of that knowledge, for the word profession itself means: "act of calling or vocation, especially one that requires a good education." On these four elements one may build securely the structure of a medical career. First and foremost I place character, in its broadest meaning, including personality, since the two are here intimately related to our subject. There is no room in the profession for the dishonest doctor. Probably fewer of our profession are sent to jail than of any other group of society because it is practically impossible for the dishonest man to survive the tests of honesty in the arduous years preceding graduation. But of equal importance as honor is honesty of purpose and sincerity of effort. Sincerity is an outstanding attribute of the medical profession and there is no more striking nor more universal trait of all great leaders—how striking it is of Ambrose Paré, Hippocrates, Lister, Halstead and Osler. Rudyard Kipling refers to this quality when he says of surgeons:

> "Is it any wonder, gentlemen, that your calling should exact the utmost that man can give—full knowledge, exquisite judgment and skill in the highest to be put forth, not at any chosen moment, but daily at the need of others? More than this: your dread art demands the instant impersonal vision which, in one breath, one beat of the pulse, can automatically dismiss every preconceived idea and impression, and as automatically recognize, accept and overcome whatever of new and unsuspected menace may have slid into the light beneath your steadfast hand.
>
> But such virtue is not reached or maintained except by a life's labor; a life's single-handed devotion. Its reward is not only the knowledge of mastery and gratitude of the layman, which may or may not bring content. Its true reward is dearly prized because of unpurchasable acknowledgment of one's fellow craftsmen."

In a profession concerned with the life and death processes of human beings a further quality seems to be essential in the personality of the doctor. For after all, death and disease are the ultimate convergence of all the many roads and by-paths stretching limitless in every direction in medical knowledge. The Latin poet said:

"Death plucks at my ear and says: 'Live—I am coming'."

A great part of our life work is devoted to this conception of holding human life from its inevitable surrender to death. Preventive medicine and sanitation aim thus to preserve health; but the largest part of our professional years are devoted to treatment of disease processes and of injuries of many sorts which cause suffering. Since, in the practice of medicine, we are occupied largely with problems of suffering, an essential

quality for the doctor to possess is sympathy, not in the narrow sense of suffering with, but in the broadest conception of sharing in the emotional and spiritual reactions of the sick. Closely allied to this quality is vitality of thought and positive aggressive faith in humanity, as the most imperatively interesting subject of study from the physical viewpoint as well as from the psychological and spiritual reactions of men in health and disease. Life, whatever it is, is never fixed but dynamic—throbbing, eternal and infinite. This is the very thing that doctors are concerned with; and when the lamp of light burns low and flickers in others, we, whose job it is to revify, must possess a boundless energy and ambition and force. This presupposes health and strength, necessary in the arduous undertaking in which we are engaged. There is no room for shirkers, for medicine demands an infinite capacity for work, expanding as demands on your time and strength steadily increase in the fulness of maturity from the very inception of professional work in college through the stress of graduation and emergence into practice. Men possess these qualities or not, as a part of their protoplasm, but they are so fundamental that they must be cultivated and developed by conscious effort.

Let us remember that the history of medicine shows its root of origin springing from primitive religion; we were originally priests or medicine men or soothsayers. At this remote point our service was largely that of faith supplemented by simple empiric physical remedies, and now, at the extreme opposite pole, far removed from religion, our profession, based on science, studies disease processes as biological phenomena, and applies a large variety of therapeutic agents to the complex patient of modern civilization. Experimental research and investigation in the clinic or laboratory replace exorcising and incantation. This is the era of biochemical and endocrine supremacy of pathology of living man, of physiological surgery, correcting abnormalities of structure or function by procedures directed to restoring function in contrast with merely mechanical removal of diseased parts. But in the application of his science to the care of the sick patient, the doctor needs remember that the "body is the temple of the soul," and that sickness disrupts and disorganizes the patient and family and all the accustomed values of life. They look to him for security and comfort in their difficulty. That personal relationship is the outstanding evidence in medical practice of the essential individualistic nature of medical practice. Whether specialist or general practitioner, the doctor should exhibit these capacities for an intelligent understanding and management of the human problems of disease in the practice of his profession.

Character and personality are, therefore, fundamental with certain attributes of sympathy, sincerity and vitality. These constitute the per-

sonal element. These qualities also are influenced and developed by the general culture and education of the individual. Doctors are presumed to be intelligent and to have keenness of intellectual perception. A few decades ago one might have entered on a medical career with little more background than a common school education, at a time when little more than that education was necessary to our pioneer communities and rather low level of cultural progress. Training in study, discipline in the acquiring of knowledge, and constantly enlarging of the horizon of mind that result from preliminary academic and scientific preparation, adequately fit the student for the professional course. It may not materially affect his handling of fractures, but it certainly assists him in following through the romantic philosophy of endocrinology to have a groundwork in Latin and Greek mythology and a little biology.

The exigencies of professional service prevent physicians from devoting time to civic or social activities. As a body they are at least of average intellectual attainment and possessed of idealism to a far greater degree than other groups of the nation. Professor Adams, discussing recently the N.R.A. and what is now commonly called the regimentation of America, stresses as the outstanding characteristic of America its essential individualism; that we are all individualists. Of no group in our national life is this more true than of physicians, for the fundamental basis of medical practice is the inviolate confidential relationship between physicians and patient. All over the world forces are at work in society which threaten the integrity of the individual, and yet, in our professional work, I doubt whether Facism, Hitlerism, or the New Deal will alter the course of natural phenomena, for babies will be born and grow up to beget other babies with the same cry for relief of pain, for more health and longer lives.

In social relationships the foundation of medicine rests on the same conception of service no matter how regulated, individualistic at least till society has adjusted itself out of the welter of its present upheaval. These forces have already resulted in Europe in profound readjustments, as illustrated by the great state insurance system of Germany, with more or less regimented patients and physicians; the panel system of England, affording practically universal health insurance, and by recent experiments in America, such as the Detroit plan and the establishment of group practice in the West. In the fundamental development of your individuality, therefore, you must be prepared, as you come into the practice of medicine, to combine with it a healthy teamwork and a sense of your professional responsibility in the social order, kaleidoscopic as it may seem now.

The very rockbottom of the foundation of medicine is the medical school. Here is where is forged in the furnace of four scorching years the very steel and armor of your professional career with which you shall come forth knighted. It has been said that: "A school is like a thrashing machine; it can make just as much noise when nothing is coming out as when wheat comes through." When men enter medical school, it may safely be assumed that they have set their heart and soul on the venture and are dominated by the passion for the profession which they intend to enter. Knowledge in medicine must be, above all, clean cut and definite. The medical school in four short years aims only to inculcate the rudiments of a vast and complicated subject matter, and we all understand that knowledge in any profession must, from the nature of things, be progressive and expanding. The groundwork is laid in those preclinical subjects of the freshman and sophomore years, which are largely the scientific basis of the two years of clinical medicine, the junior and senior years. Whatever arbitrary divisions may be set up, the aim is to establish in orderly sequence a knowledge of the normal in structure and function before a study of the abnormal, and lift as high as possible the curtain on the bewildering panorama of the medical specialties. On these basic subjects is founded, most likely once and for all, your entire professional career since, except in highly specialized careers, physicians seldom add to their undergraduate study of these subjects, at least in proportion to the continuous addition so necessary in every career in clinical medicine.

Knowledge, beside being necessarily extremely direct and accurate, must in our profession be both theoretical and practical. Theory piles on you in your college course primarily from books, in the ready use of which you should grow familiar, to accumulate an ever expanding and inspirational interest, growing familiar also with the vast stock of journals so that, within your capacity, you may have a well defined conception of the subject matter in hand. This groundwork involves the rapid accumulation of facts, a study of vital phenomena crowded in to what appears to be a tangled skein but through it all runs the pattern of order and sequence as each subject finally settles itself in your consciousness.

I would not dare to offer suggestions as to how you should study, although I am profoundly impressed with the failure of so many students to grasp early in their college course an understanding of the study of medicine by reason of their showing profound evidence of continued mental indigestion characterized by lack of assimiliation, excessive elimination, and over-production of intellectual gas. Let me urge on you that whatever you learn should be learned clearly so that basic facts will be available. For example, many years ago John Murphy, one of America's

greatest surgeons, conducted clinics, careful reports of which have fortunately been preserved, which above all are characterized by the accuracy and clearness and simplicity with which he presented his material. Let me illustrate by a specific example: He insisted that in the diagnosis of appendicitis four or five cardinal symptoms and signs established the diagnosis, a knowledge of which, together with a simple classification of the pathology, fix in the mind of the student this common disease.

Knowledge must be practical in the use of the complicated procedures and numerous instruments of diagnosis and treatment. Keen observation, continuous repetition of the mental images necessary for the performance of these procedures and learning by precept will establish the groundwork on which you may build. Supremacy in this as in all technical procedures demands arduous preparation and continuous practice.

If I had advice to offer you, it would be that you read during your junior and senior years straight through, a standard single volume textbook in medicine and in surgery, in addition to the preparation necessary for the complete course of lectures, so that you may be familiar with the whole field of common diseases. These I would have you read as you read textbooks in history or economics in the academic courses.

What is the position of the medical specialties in this fundamental plan? It is obvious at once that the student cannot be even superficially prepared in specialties although he must have at least an introduction to these subjects. The specialist has been defined as a man knowing more and more about less and less. This cynical comment is often quoted but is merely a catch phrase; someone has recently defined the specialist as a doctor who has more facts available on any subject than the average doctor. The specialist is primarily a doctor who has devoted particular study to a subject not only to accumulate more facts, but who in addition acquires a greater manual dexterity in the development and performance of necessary manipulations and who acquires thereby a more vital interpretation of the phenomena coming within this specialty. The application of these special resources to the problem in hand results in direct benefit not only to the patient but to the medical profession. While to the student the specialties often seem singularly unrelated, they are all closely interwoven, overlapping in certain fields although widely separated in other fields.

The foundation of the specialist is laid in his general course and there is practically a universal agreement that a general foundation is essential to a successful career as a specialist. A citizen living, let us say, in a city, has an intimate knowledge of his community, the habits and thoughts of his neighbors and, in a general way, he is familiar with the customs and

civilization of sections of his own country remote from his home. If he travels to a foreign country, he can hardly expect, in a few days or weeks, to have the same knowledge of that country that he has of his own, although he will acquire, in a greater or less degree, an impression of the land he has visited and of its people. One should know medicine as one knows his own country and have a knowledge of specialties somewhat similar to the information acquired by the traveler described. Specialization is a necessary development in the expansion of knowledge, but in the last analysis in our profession it is not an independent project but a part of the whole structure of medicine resting on the same general foundation.

The hope in all of us, and our ambition expressed or implied, is to erect our professional house so large and so high that it will stand sturdy and strong and, perhaps, commanding and enduring through generations like the houses of the great men of our profession. The foundation then must be laid like theirs, on character and knowledge of subject acquired by unremitting toil and a boundless energy and sincerity of purpose and effort.

The Relations of General and Medical Education*

HOMER P. RAINEY, PH.D., LL.D.
President, Bucknell University
Lewisburg, Pennsylvania

We are facing a novel situation in American education. It is one that was never anticipated by those who developed our great system of free public education. It was a simple thing to talk about giving free public education to every boy and girl and to every man and woman one hundred years ago. At that time only a very small percentage of the children even of elementary school age were enrolled in school, and the length of the school year was only three or four months. At that time, public high schools were almost unknown, and there were only a few state universities.

Today, virtually 95 per cent of all children of elementary school age are actually enrolled in school, and for a school year of from six to nine months duration. Approximately 60 per cent of all children of high school age are actually enrolled in the secondary schools of the country, and approximately from 12 to 15 per cent of our adult population above the high school age are enrolled in colleges, universities, professional schools, or in adult education of some sort.

It is only in elementary education that we may say that we have "made good" on the commitment of one hundred years ago. The saturation point in elementary education was reached ten or more years ago. In secondary education, there is no indication that a saturation point has been reached. Twenty years ago approximately 18 per cent of the secondary population were actually enrolled in school. Since that time this percentage has been increasing about 2 per cent a year, until now between 55 and 60 per cent are enrolled for the country at large.

In higher education, the saturation point has not been reached. The percentage of the adult population above high school age actually going to school has been increasing approximately 1 per cent a year for the last fifteen years, and is still increasing.

Hence, we still have more education to provide if we are to continue to work under the commitment made one hundred years ago. But in the face of this incompleted commitment, two very significant things have happened. In the first place, our system of educational support for public education has virtually broken down in many states, and in many areas of the United States. It is a serious question whether the states can con-

* Address delivered at the One Hundred and Tenth Commencement of Jefferson Medical College, held June 7, 1935.

tinue to assume an increasing cost for public education. This constitutes one of the most vital social problems in America today. But a second situation has developed which is of even greater social significance—namely, the professional and vocational life of our society cannot absorb this ever-increasing product from our secondary schools and colleges. There is almost a complete saturation in practically every profession and vocation in the United States today. The professions of medicine, law, engineering and teaching are terribly over-crowded. There are millions of unemployed; and there is still an increasing surplus of candidates coming on through the secondary schools and colleges. Practically all first-class professional schools today are limiting their enrolments and are taking only a fraction of those who apply for admission, and yet they have an increasing surplus coming on from below.

The field of medicine is one of the best illustrations of this situation. The medical schools sensed this situation ten or more years ago and have held their enrolment fairly constant ever since. At the same time, they have greatly raised the requirements for admission. A few years ago one could get into a good medical school with only two years of college preparation. That may still be done, but only in very rare instances. In the main, today, one must be not only a college graduate, but he must be among the upper 5 or 10 per cent of college graduates with respect to his grades, if he is to have any reasonable chance of being admitted to a first-class medical school.

Here, then, is our social problem: A commitment to give every boy and girl, and every man and woman an education at public expense, but before we have reached that goal we find the program almost, if not impossible, to finance, and, further, that our society cannot absorb the products of our schools. Consider a few facts concerning the situation in Pennsylvania. There are now in Pennsylvania more than 200,000 high school graduates who are unemployed and unable to go on to college, university or professional school of any kind. There are more than 600,000 other boys and girls in the "teen" ages who are not in school at all. Thus, there are more than three-quarters of a million boys and girls in Pennsylvania alone who are caught in these great social forces. There are three million in the country at large.

What are some of the significant social implications for education in this situation?

It is evident that more positions must be found for these people, or there must be a further limitation of the number we will allow to enter school and eventually find their way into the professions. In medicine, we have more physicians per unit of population than any other country in

the world. The medical profession is devoting much consideration to the question of whether society can absorb more trained medical people. If the medical schools continue to limit their enrolments rather rigidly, and if the supply of candidates continues to increase, as it is now doing, the competition for these places will become increasingly more severe. This raises the important question, which is the heart of the problem I want to discuss, what is the best type of general or pre-professional training as preparation for medical and other types of professional education?

This problem is of tremendous interest to us who have the responsibility of college and pre-professional training. It is of equal interest to the medical schools, since they are desirous of having the best prepared men and women it is possible to secure. It is also a matter of great interest to the public, since it greatly affects the type and quality of medical services which the public receives. As a matter of fact, the answer to our educational problem is ultimately a social one, namely, what kind of medical services do we want, and what kind of physicians do we want our physicians to be?

It seems to me that from the social point of view we need two distinct types of medical services. We need, first, to advance the science of medicine by reasearch in all the fundamental sciences related to medicine, and, second, we need to develop skilled practitioners and technicians who have the knowledge and ability to apply the science of medicine to the cure of disease and the relief of human suffering. What are the best and most effective types of general and professional education necessary to realize these objectives?

The medical schools and the colleges are coming to a fairly definite agreement on this question. Until rather recently there were those who felt that there was a large element of conflict between the objectives of liberal or general education, on the one hand, and professional education on the other. The colleges and pre-professional schools have been thinking mainly of the objectives of liberal training, and the professional schools have been insisting on extreme specialization, not only in their own schools, but they have insisted that a great part of a student's pre-professional training should be in rather narrow specialized fields. Thus, for a time, it seemed that we were almost at an *impassé*. While this issue was going on, the colleges were at the same time dictating to the lower schools. Each level of education was insisting that the one below it should shape its program almost solely in terms of its narrow specialized objectives. Now, there must of necessity be some continuity of the educational process and some relation between the various levels or units of our educational sys-

tem, but we are coming to realize that each unit has its own peculiar objectives, and that it should be left relatively free to develop those objectives.

We in colleges are beginning to learn that success in college has little relationship to the particular combination of courses which a student may pursue in secondary school. It is a matter of scientific demonstration that no one combination of high school courses is any better index of college success than another. There are other factors that are far more important to college success than the particular courses which a student may take in high school. They are a student's rank in his graduating class in high school; his intelligence, as measured by a good intelligence test; his character traits; and his general attitude toward getting an education. Hence, the colleges are leaving the high schools relatively free to discover their own peculiar function and to achieve their own objectives unhampered by an excess of dictation from the colleges.

The professional schools are coming to the same attitude toward the colleges, and are themselves beginning to stress the need for a broad liberal education as the best preparation for a professional career. Two recent surveys emphasize this trend—the one of medical education and the other of dental education. A recent report of the Curriculum Survey Committee of the American Association of Dental Schools makes the following comment:

"The tendency to raise professional education above the first two years of college is based on at least three considerations: (1) The need for a broad education on the part of men and women who practice the professions; (2) the need for maturity in selecting and pursuing a professional course; and (3) the tendency to expand secondary education to include the work of the freshman and sophomore years of college. Other considerations which are sometimes urged in arguments for lengthening the period of education preliminary to professional training are the desire on the part of members already in the professions to limit the number of recruits, and the desire on the part of teachers and administrators to crowd down into preliminary education the more general courses to make room for specialized courses.

"In the Report on Dental Education in the United States and Canada the following statement is made:

'A broad refining education is a fundamental need for those who devote their lives to the professions of greatest service to humanity, and who aspire to usefulness beyond the responsibilities of the technician. Leadership in the professional sphere, and in the opportunities in social endeavor

and influence, is rooted in the soil of a cultural education. Slovenly intellectual habits and undeveloped mental powers are symbols of mediocrity. Only individuals of rare capacity for growth and self instruction rise above the plane of the artisan, if they have not been well trained to use their minds and, before entering the dental school, have not formed the intellectual habits and developed the mental capabilities that the study of dentistry requires.'

"Dentists are concerned with a variety of community, social and individual problems, all of which tend to become more complicated and to demand an increasing understanding of many things. A great diversity of factors contribute to success in later professional life and to the public service that is expected of the dentist. Dentists, in common with all professional men, should be broadly educated in relation to the wide range of social, economic and professional situations with which they have to deal.

"Moreover, if the dentist is to participate actively in the cultural life about him, if he is to share the enrichment which comes from associating with cultured and intellectual people, he must bring to that participation and association a background of understanding and appreciation of many things that conduce in no special way to the efficient discharge of his particular duties, either as a citizen or as an individual. The ability of the dentist to enter into the cultural life of his time, to understand the world in which he lives, to relate the world of the past with the present and the future, to enrich and discipline his tastes—in fine, to set himself above the daily commonplace—is a factor of no mean importance in fortifying him for his arduous duties, as well as in elevating his professional practice and dignifying his profession. Professions are judged, at least in part, by the intellectual attainments of the men and women who practice them; in the opinion of the public, professions should not be practiced by men and women who are not broadly educated."

The Commission on Medical Education, which reported in 1932, made the following statement:

"Premedical education should be general, not preprofessional education. A sound general training is of more value as a preparation for the study of medicine than a narrow, technical training limited largely to the premedical sciences.

"If the premedical period is intended for the purposes of general education, it should be permitted to serve these purposes. The tendency of medical schools and regulatory bodies to define in detail the amount and character of premedical education is contrary to the spirit of real education, the unit of which is the student, not the course or the curriculum."

Similarly, a report on legal education has gone even farther than other professions and does not even make any suggestions or recommendations concerning pre-legal education.

This is a hopeful trend, and has much promise of improving the nature and quality both of collegiate and professional education.

There is another important implication both for collegiate and professional education growing out of the present situation. It relates to the length of the period of pre-professional training. In recent years there has been much discussion in educational circles about the desire to shorten the period of secondary and pre-professional education by a period of two years in order that one may enter the professions earlier. It has been argued also that such a shortening of the period of secondary training would bring our American school system in line with those of the principal European countries. It is this idea that has played a considerable influence in the development of the Junior High School, and, in later years, of the Junior College. It is quite clear from the social and economic situation that there is little point to shortening the period of pre-professional training. There is more reason to lengthen it. Something must be done to care for the ever-increasing number of high school graduates who cannot find places in the life of our society. The best possible thing to do for them is to give them, at least, two more years of general education.

Such a program would be highly beneficial from almost every point of view. It would help to solve the social and economic problem. It would be a distinct cultural advance in that much more of a liberal education could be provided in these two years. It would, undoubtedly, improve the quality of collegiate education, and would result in more mature and better educated men for all the professions.

In conclusion, I wish to stress the great need in every phase of American life for a broader and more fundamental liberal culture. America is now reaching her maturity. There is no longer a frontier to be pushed further westward. The agriculture, industries and natural resources of the continent have been developed. We are now facing a new frontier. The new frontier is social, spiritual and cultural. Our great need now is to place the emphasis in our educational program on those values which enrich our lives. America is now in search of a genuine culture. The author of a recent survey of American culture says in his preface that "no nation of the Western world has produced so vast a literature of disillusion." "Most of this literature," he states, "dates from the days of prosperity. The recent collapse of the economic system is merely a tragic postscript. The entire outfit of mass ideals and stereotypes that grew up

with that system has suffered a mortal shock. In its songs, its anecdotes, its popular magazines, its movies, its plays—the nation is satirizing itself with a torrent of bitter laughter. Beneath that laugher is a genuine and growing concern about the quality of American life."

This author's thesis is that there is a great opportunity for a genuine American culture, if we can only rid ourselves of the preoccupation of material values which has consumed so much of our energies in the past, and concentrate on "those achievements in thought, word or deed which constitute a permanent enrichment of the human heritage, and add to the meaning and the beauty of the life of man."

The American liberal arts college will do this task if it can be released from a multitude of other objectives so that it may devote itself exclusively to its major function. It is for the leaders of professional schools like the Jefferson Medical College, and the leaders of liberal arts colleges to co-operate in achieving this objective.

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American Students in Foreign Medical Schools

On request of the Council on Medical Education and Hospitals of the American Medical Association, the application record of Americans in foreign medical schools other than the three extramural schools of Scotland was checked. Inasmuch as the study of applicants was not made for the years 1930 and 1931, many of these students could not be checked, nevertheless nearly 21.7 per cent appear in the files of the Association. Of the 502 students attending 69 medical schools in 17 foreign countries, 108 had applied for admission to our own medical schools. Others may have made application during the years 1930 and 1931 for which no cards are on file. Only 25 of these students, or 23.1 per cent, were accepted. Eighty-three students had no acceptances. The 108 students made 708 applications. Twenty-six students made only one application; six were accepted. Twenty-five students made from 10 to 32 applications, a total of 457 applications, and only two students were accepted, one acceptance each. Fifty-one students made from 2 to 9 applications, a total of 215 applications, of which 16 were accepted, representing 14 students. One student had 2 acceptances; one had three acceptances. High numbers of applications made by individual students were: 32, 28, 27, 25, 19, 18, 17, 16, 15, 14, 13, 12, 11 and 10.

No record was found for students attending schools in the following six countries: Belgium, China, Czechoslovakia, Lithuania, Poland and Portugal.

Eleven countries had students whose records were found: Austria, England, France, Germany, Hungary, Ireland, Italy, Philippines, Scotland, Switzerland and Syria. The largest number of American students are attending the medical school in Rome, 163, of whom 46 had previously applied to an American school. A previous check showed that two of these had failed in an American school.

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Statistics on Medical Education

The *Journal of the American Medical Association,* August 31, 1935, presents the statistical data and editorial comment on medical education for the academic year 1934-1935 prepared by the Council on Medical Education and Hospitals, together with a revised list of hospitals approved for internships and residencies in specialties and the essentials of an acceptable school of occupational therapy. These data cover seventy-seven medical schools in the United States and ten in Canada, 607 hospitals approved for internships and 392 hospitals offering approved residencies in specialties. These data together with the data published from time to time in this JOURNAL by the Association of American Medical Colleges provide complete information on virtually every aspect of medical education without overlapping or duplication.

As pevious data published by this Association have shown, there is a steady increase, year by year, in the number of students matriculating or enroling for the first time and in the number who remain in school and complete the first year. Not all students who enroll complete the year. Quite a few drop out within the first week or ten days after

the opening of the academic year. As a rule, these students are not counted at the end of the year as having been in attendance, hence there is always a slight discrepancy in the figures reported at one time or another. Nevertheless, the number of medical students has increased and has neared the all time high established in 1905.

As the study of applicants made by this Association has shown, the number of applicants and the number of applications made by them has increased year by year. Present indications are that the increase will continue for the academic year 1935-1936, although exact figures cannot yet be given as all medical schools have not sent in their cards yet.

The number of medical graduates has also increased. In 1935 there were only 10 per cent fewer graduates than in 1905. The number doubtless will be greater in 1937 or 1938, in which years there was a considerable increase in the enrolment of medical students in the first year of the course.

All of the information given by the Council in its report is well worth careful study. It answers many questions and should prove useful, especially to the medical schools of the country.

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The Alexander Cochran Bowen Scholarships

Two "Alexander Cochran Bowen Scholarships" are offered by The New York Academy of Medicine, available in 1935. These scholarships are intended to provide for one year of foreign study in a clinical subject and are open to recent graduate interns, men and women, who wish to prepare themselves for the practice of clinical medicine or surgery in any of their branches. The internship must have been taken in a municipal or voluntary hospital of New York City. Candidates may be nominated by the Medical Board of a hospital from those who for financial reasons would otherwise be unable to undertake further study.

The award of the scholarships will be made by the Committee on Medical Education of the New York Academy of Medicine, 2 East 103d Street, New York City.

The recipients of the scholarships may determine the country and place where they propose to carry on further clinical study, subject to the approval of the Committee on Medical Education.

At the termination of the period of clinical study, the recipients of the scholarships are expected to prepare theses or studies on a clinical subject, which may be presented before a meeting of the Academy or one of its Sections, and may be published by the authors or by the Academy, subject to the approval of the Committee on Medical Education.

The scholarships now available are for a period of one year and amount to $1,900 each. Applications with recommendations of the Medical Board and other credentials should be sent to the Committee on Medical Education. The Committee will make arrangements to interview candidates.

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Reduced Fares to Toronto

Effort is being made to secure from the various passenger associations in the United States and Canada the reduced convention fare of a fare and one-third to Toronto. At this time it is not possible to state that this reduction will be granted, but delegates and others coming to the meeting are advised to make inquiry of their local railroad agents when purchasing tickets whether the rate has been granted. If granted, certificates will be mailed by the secretary of the Association of American Medical Colleges

to the deans of member colleges and all others who will send him a request for certificates, stating the number wanted. In any event, whether the reduction is granted or not, delegates are advised to purchase return Pullman reservations, inasmuch as the Dominion of Canada levies a 10 per cent tax on such tickets.

The Canadian Pacific Railroad has agreed to provide a special Pullman from Chicago to Toronto and from Detroit to Toronto in order that delegates may make the trip in company. Routing out of Chicago is via the Michigan Central Railroad. The train leaves Chicago at 7:30 P. M. (CST) arriving in Toronto the following morning at 8:25. The Detroit sleeper will be ready for occupancy at 9:30 P. M., leaving at 2:30 o'clock the following morning. Delegates from the East and Southeast should consult local railroad agents for time of departure of their train, going via Buffalo. Delegates from the New England states may go via Buffalo or Montreal.

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Toronto Program

The first session of the fiorty-sixth annual meeting of the Association of American Medical Colleges to be held on Monday, October 28, in Hart House of the University of Toronto, should have special interest for teachers of biology, chemistry and physics in the arts colleges and universities engaged in the preparation of students for the study of medicine. It is the first time that such a program has been offered. It should go far to clear up misunderstandings as to what this preparation should be and just what the medical schools would like students to have by way of preliminary training for the study of medicine. The arts colleges have attempted to get guidance by making a study of the requirements for admission to medical schools as published in the catalogs or annual announcements of these schools. Unfortunately the information thus gained has not always given the exact information needed or there has been misinterpretation. Again, the requirements for admission to medical schools, while, in the main, fairly uniform, have differed so widely that the arts colleges have found it impossible to arrange courses so as to meet all requirements of all medical schools. Hence, considerable confusion has resulted. The Toronto program was conceived to clarify the situation. Three professors of well known ability in their special fields will present the case of the college and three professors representing cognate branches in the medical school, men who have given this problem much thought over a long period of years, will present the side of the medical school.

In order that the discussion on these papers will be as complete as circumstances may permit, invitations to attend the meeting have been sent to several hundred teachers of chemistry, physics and biology in arts colleges situated in what might be termed the "Toronto area." All those who have not received an invitation but who would like to come to the meeting, will be most welcome. It is planned to send to every teacher of these subjects in all colleges (approximately 600) which send students into medical schools each year a copy of the JOURNAL in which these six papers and the discussions thereon will be published, to stimulate or initiate consideration of this problem.

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California Requirements for Foreign Medical Graduates

The California State Board of Medical Examiners announces that after September 14 graduates of foreign medical colleges must show the following requirements, in addition to those contained in the standard application for a license to practice medicine in California:

1. A license to practice medicine and/or surgery in the country wherein is located the medical school which granted them their diploma.

2. One year internship served in an approved hospital in the United States after fulfillment of condition number 1, or

3. Completion of the senior course in an approved medical school in the United States in lieu of requirement number 2.

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Opening for Bacteriologist In New York City

The Municipal Civil Service Commission of New York City announces an examination for the position of associate director of the bacteriologic laboratories in the health department. Applications will be received up to October 4, and the dates for the examination will be announced later. All qualified citizens of the United States are eligible for the examination, but the appointee must reside in New York after he has accepted the position. Applicants must be not more than 55 years of age and have not less than five years of satisfactory experience in a bacteriologic laboratory of recognized standing. The salary is $6,000 per year. Applications should be sent to William H. Allen, secretary, Municipal Civil Service Commission, Room 1400, Municipal Building, Manhattan.

Visitors to Canada

The Deputy Minister of Immigration and Colonization extends greetings to the Association on the eve of the forthcoming annual convention to be held in Toronto, October 28-30, 1935, and expresses the personal hope that the meeting will be a great success and that every experience of the visitors from the United States will tend toward still warmer friendship and a clearer understanding between Canada and the United States. Special instructions have been sent to the Canadian inspectors of immigration at the border to insure that every courtesy consistent with the regulations will be extended to these visitors.

Citizens of the United States entering Canada as tourists may expect no inconvenience whatever. Persons who are not citizens of the United States should carry evidence that they are legally resident in the United States and they should be in the position to satisfy the Canadian officer at the International boundary that they will not have any difficulty in returning to the United States. Tourists' automobiles are admitted without charge and may be driven for pleasure in Canada under their state licenses for a period of sixty days, which period may be extended on application.

College News

Western Reserve University School of Medicine

The faculty has approved a plan for liberalizing somewhat the curriculum of the first two years.

1. The basic course of 1,728 hours for the first two years is required of all students.

2. Outstanding students, approximately the upper seventh of the class, may use all the remaining time for optional work, taking organized courses or not as they desire.

3. The remainder of the students are required to take organized courses during approximately one-half of the free time, using the remainder in supplementing the studies along the lines of their own volition. Optional supplementary courses are being offered in embryology, nutrition, physiology and pathology.

Theoretically, at least, this plan appears to offer advantages.

1. It preserves a fixed basic curriculum, amounting to approximately three-fourths of the present course, and avoids imposing an excessive number of assigned hours which the average inexperienced student could not be expected to plan advantageously. It is in consonance with the present tendency of other schools to cut down the large blocks of free time in the first two years, with which they have experimented.

2. It gives all students some choice of subjects, minimum requirements having been fulfilled.

3. It gives the abler students an opportunity to pursue subjects in which they are especially interested, for a sufficient time to make the effort worth while, without prejudice to required work.

Certain changes in sequence have also been made, chiefly in biochemistry. Formerly taught in the first half year, it is transferred to the second half year through presenting it in closer relationship with physiology. The physiology will be given in the first half of the second year.

The final examinations in all second year subjects will be given at the end of the second year, irrespective of the time of year when the course ends.

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University of Kansas School of Medicine

A department of medical research has been established at Bell Memorial Hospital. Dr. Ralph H. Major, professor of medicine, has been named director. Dr. Clarence J. Weber, instructor in medicine, has been appointed associate in medical research.

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University of Rochester School of Medicine

The University of California conferred the honorary degree of doctor of laws on Dr. George H. Whipple, dean.

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University of Texas School of Medicine

Dr. Wm. S. Carter has been appointed dean to succeed the late Dr. George E. Bethel. Dr. Carter was associate director of the division of Medical Education of the Rockefeller Foundation for the past twelve years. He had previously been a member of the faculty of this school from 1897 to 1923, serving as professor of physiology and dean.

The University of Texas and the Sealy and Smith Foundation appropriated $200,000 for the erection of a Negro unit to the John Sealy Hospital.

Dr. Richard E. Scammon, dean of medical sciences in the University of Minnesota, delivered the commencement address. There were eighty-three graduates.

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Jefferson Medical College

The graduating class numbered 142 bringing the total number of graduates to 16,042. The graduates originated in twenty different states. Sixty-three members of the graduating class were commissioned as first lieutenants in the Medical Officers' Training Corps of the United States Army.

A portrait of Dr. Nathan L. Hatfield, a member of the first graduating class of Jefferson Medical College, and two diplomas, one belonging to Dr. Nathan L. Hatfield, class of 1826, and that of his son, Dr. Nathan Hatfield, class of 1865, were presented to the College by Dean Ross V. Patterson on behalf of Mr. Henry R. Hatfield, son of Dr. Nathan L. Hatfield.

During the year the following deaths occurred: Mr. Alba B. Johnson, president of the Board of Trustees; James C. Wilson, M.D., emeritus professor of practice of medicine and clinical medicine; Howard F. Hansell, M.D., emeritus professor of ophthalmology; Harvey M. Righter, M.D., demonstrator of Clinical surgery; Thomas Cook Stellwagen, M.D., professor of genito-urinary surgery.

The graduating class of 1935 presented a portrait of the late Dr. Thomas Cook Stellwagen to the College April 4, 1935.

The following promotions and appointments in the teaching corps have been made during the past session: Warren B. Davis, M.D., clinical professor of oral surgery; Edward F. Corson, M.D., associate professor of dermatology; Benjamin P. Weiss, M.D., associate professor of neurology; Clifford B. Lull, M.D., Harry Stuckert, M.D., and Thaddeus L. Montgomery, M.D., assistant professors of obstetrics; John T. Farrell, Jr., M.D., assistant professor of roentgenology and roentgenologist to the department of anatomy; Henry B. Decker, M.D., assistant professor of dermatology; J. Bernard Bernstine, M.D., and James F. Carroll, M.D., associates in obstetrics; Garfield G. Duncan, M.D., and A. Cantarow, M.D., associates in medicine; C. Fred Becker, M.D., associate in nervous and mental diseases; Baldwin L. Keyes, M.D., associate in psycho-pediatrics.

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Temple University School of Medicine

The degree of Doctor of Medicine was conferred on 100 members of the senior class on June 13. Honorary degrees were conferred on Scott Marion Loftin, president of the American Bar Association; Dr. Edward Martin, emeritus professor of surgery at the University of Pennsylvania, and William Henry Meese, vice-president and work manager of the Western Electric Company, Baltimore.

Dr. Charles Leonard Brown has been appointed professor and head of the department of medicine. Dr. Brown was formerly associate professor of medicine at the University of Michigan. Dr. John Lansbury, formerly of the Mayo Clinic and now associate to Dr. Leonard G. Rowntree at the Philadelphia Research Institute, was appointed associate professor of medicine. Additional appointments: Dr. Louis Fletcher, assistant in anatomy, and Dr. Joseph Lomax, clinical assistant in obstetrics. Promotions: Gerald H. J. Pearson from associate to assistant professor of pediatrics; Pascal F. Lucchesi from instructor to associate in pediatrics; J. A. Bowman from demonstrator to lecturer on pediatrics; Bradford Green from instructor to demonstrator in obstetrics.

Dr. Frank H. Krusen, associate dean and director of the department of physical medicine, has resigned to take charge of the physical therapy department at the Mayo Clinic.

Medical College of Virginia

Dr. Albert C. Broders of the Mayo Clinic has accepted the position of professor of surgical pathology and director of cancer research, effective in August. Dr. Frank L. Apperly will continue as head of the department of general and physio-pathology.

Dr. William B. Porter, professor of medicine, is spending about two months in Puerto Rico making a study of the adjustment mechanisms occurring in the circulatory apparatus in chronic anemias associated with parasitic infections. Dr. Ramon Suarez of Puerto Rico will be associated with Dr. Porter in this investigation and will deal primarily with the physical and chemical changes in the blood.

The fifth Saint Philip Hospital postgraduate clinic for Negro physicians was held June 17-29. Forty-one physicians matriculated in this clinic representing the states of Kentucky, North Carolina, South Carolina, Texas, and Virginia. The clinic is subsidized by the General Education Board of New York.

Dr. Frank L. Apperly, professor of pathology, will spend July in Europe visiting various hospitals and clinics.

Miss Mary Alice Riley has been appointed head of the Social Service department. She came to the institution from the Lying-In Hospital of New York city.

Dr. William Branch Porter, professor of medicine, has spent the past two months in San Juan, Puerto Rico, doing special investigative work on the blood flow in cases of anemia. Dr. Porter has carried on his experiments among patients hospitalized in the University Hospital of the School of Tropical Medicine, Mimiya Clinic and the Municipal Hospital.

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Duke University School of Medicine

At the graduating exercises held June 3, forty-seven medical students received the degree of Doctor of Medicine and seven the degree of Bachelor of Science in Medicine.

June 8, the spring quarter ended. The summer quarter commenced June 17 with fifty-eight students registered here or elsewhere for credit at Duke. One of these is studying in London and Dublin, for which he will be given credit here.

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University of Georgia School of Medicine

Dr. G. Lombard Kelly, who has served as vice-dean since 1934, was appointed dean by the regents of the University System of Georgia, effective September 1. Dr. Kelly is also professor and head of the department of anatomy. The Board of Trustees of the University Hospital, owned and maintained by the city of Augusta, and in which most of the clinical teaching is done, has placed Dr. Kelly in charge as superintendent. The business affairs of the hospital will be in charge of a manager who will be responsible to Dr. Kelly.

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Indiana University School of Medicine

Requirements for matriculation: June 1, 1935, the Medical Council of the School of Medicine adopted the following rules for the direction of the committee on admission:

A. The minimum requirement shall be 64 hours of premedical work; only mature students of high scholastic attainment and high aptitude rating to be admitted on this minimum.

B. That students 19 years of age or younger be admitted only on very exceptional premedical and aptitude records and a minimum of three (preferably four) full years of collegiate work.

C. That students 20 years of age be admitted on presentation of three years of collegiate work of good quality, providing the aptitude rating is good.

D. That in consideration of the difficulty in securing internships for women graduates and the importance to women, therefore, of a particularly good foundation and reasonable maturity as a prerequisite for the study of medicine, we recommend that women with less than the A.B. degree and less than 21 years of age should only very exceptionally be admitted to the School of Medicine.

E. Students with a qualitative standing as low as 1.3, or with an aptitude rating in the lower one-third, but meeting other requirements satisfactorily, will be admitted to the School of Medicine only if in an individual interview with each member of the committee on admission, they succeed in convincing each member of the committee of their preparation for medical study.

The Council also voted that beginning with the class of 1937-38, three full years, 90 semester hours, of collegiate work should be required of all students for matriculation in the Indiana University School of Medicine.

Also by vote of the Council it was recommended that the class of 1936-37 be limited to 110 freshmen.

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Cornell University Medical College

Dr. Herbert S. Gasser, professor of physiology, has been appointed director of the Rockefeller Institute for Medical Research to succeed Dr. Simon Flexner, who retires soon.

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University of Pennsylvania School of Medicine

Dr. Edward A. Schumann, associate professor of obstetrics, has been appointed professor to succeed the late Dr. Edmund B. Piper.

Dr. Clarence A. Patten, associate professor of neurology in the Graduate School of Medicine, has been appointed professor to succeed the late Dr. Theo. H. Weisenburg.

University of Iowa College of Medicine

July 1, 1935, Dr. Ewen Murchison MacEwen took over the deanship of this College. Dr. MacEwen took his baccalaureate degree in science from Coe College (Cedar Rapids, Iowa) in 1907 and was granted his doctorate in medicine from the State University of Iowa in 1912, and his master of science degree in 1915 (from Iowa). He has been a member of the staff of the department of anatomy since graduation; he was made professor of anatomy in 1920. On the death of Dr. H. J. Prentiss in 1931, Dr. MacEwen was appointed the head of the department of anatomy.

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University of Chicago Division of Biological Sciences

The duties of superintendent of the Albert Billings Hospital have been assumed by Dr. Bachmeyer, director of clinics, Mr. Dinsmore having left the service on leave of absence.

Dr. N. Paul Hudson, professor of hygiene and bacteriology, has resigned to accept the position of professor of bacteriology and chairman of the department in Ohio State University. Assistant professors Floyd S. Markham, J. M. Birkeland and O. C. Wolpert also resigned to accompany Dr. Hudson.

Dr. A. Baird Hastings, professor of biochemistry in the department of medicine under the Lasker Foundation and also professor of physiology in the department of physiology, has resigned to accept the appointment as Hamilton Kuhn professor of biological chemistry in Harvard University to succeed the late Professor Otto Folin.

New appointments: Dr. Margaret Gerard, associate professor of psychiatry; Dr. Hugh T. Carmichael, instructor in psychiatry. Promotions: Dr. Allen T. Kenyon, assistant professor of medicine; Drs. Katsuji Kato, Douglas N. Buchanan and

Arthur R. Turner, assistant professors of pediatrics; Dr. Albert H. Bryan and Charles W. Eisele, instructors in medicine; Dr. F. E. Templeton and John Volderauer, instructors in roentgenology.

Dr. Percival Bailey and Dr. B. C. H. Harvey have left for Europe to attend the meeting of the International Association of Neurologists and the International Association of Anatomists and the British Association for the Advancement of Science.

Dr. Adair and Dr. Davis received the gold medal of the American Medical Association for their exhibit at the annual meeting of the A. M. A. at Atlantic City.

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University of Toronto Faculty of Medicine

A one week's course on fractures will begin September 23. The course will consist of lectures, demonstrations, clinics, operation and practical instruction on the cadover. It will be conducted in the Toronto General Hospital, St. Michael's Hospital, the Hospital for Sick Children and the Banting Institute. The course will be made as practical as possible and an attempt will be made to have the students take part in all demonstrations.

The fee is $25.

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Yale Medical School

The student body presented to the school an oil painting of Dr. Milton C. Winternitz who retired from the deanship after a fifteen year incumbency.

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Creighton University School of Medicine

New Appointments: Dr. Wm. E. Kroupa, assistant in obstetrics; Drs. Robert J. Drake, Morris H. Brodkey, John W. McGee and Ben Slutzky, assistants in medicine; Dr. Wm. N. Hahn, acting assistant in ophthalmology; Dr. John Stegeman, acting assistant in otolaryngology and ophthalmology.

Promotions: Dr. Thomas McCurdy, assistant professor of pathology; Dr. Samuel A. Osheroff, instructor in gynecology and obstetrics; Dr. W. Joseph McMartin, instructor in urology and anatomy; Dr. Julius M. Moskovitz, instructor in gynecology.

◆ ◆

Harvard Medical School

Dr. Abraham Myerson was appointed clinical professor of psychiatry. Dr. Burwell, the new dean, was appointed to the staff of Peter Bent Brigham Hospital.

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Georgetown University School of Medicine

Promotions and appointments: Dr. Vincent J. Dardinski, professor of anatomy and director of the department; he has been associate professor of pathology and parasitology. Dr. Reginald A. Cutting, professor of physiology and director of the department. Dr. John A. Simpson, assistant professor in the department of pathology and parasitology. Dr. Philip L. Martinez, assistant professor in the department of anatomy. Dr. George J. Brilmyer, professor of pathology and parasitology. Dr. Harold V. Connerty, assistant professor of pathology and parasitology. Dr. Wm. Gerry Morgan, dean, has resigned, but will retain his professorship in gastro-enterology.

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University of Michigan Medical School

The University conferred the honorary degree of doctor of science on Dr. Walter R. Parker, who had been professor of ophthalmology for twenty-eight years.

Reverend David V. McCauley, formerly regent, has assumed the deanship.

Bradley M. Padden, Ph.D., assistant director of medical sciences of the Rockefeller Foundation, has been appointed

professor of anatomy and director of the department, to succeed the late Dr. G. C. Huber.

The Rockefeller Foundation has appropriated $14,000 for the study of the application of spectroscopic methods to medical problems, and $25,000 for special research in the physiology of respiration.

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McGill University
Faculty of Medicine

Dr. Wesley Bourne, lecturer in anesthesia, has received the first Hickman Medal of the Royal Society of Medicine of England. This award was founded in 1931, to be given every three years for original work of outstanding merit in anesthesia or directly related subjects.

Dr. Jonathan C. Meakins, professor of medicine, has been made a fellow of the Royal College of Physicians of London. Dr. James B. Collip, professor and head of the department of biochemistry, received the honorary degree of doctor of laws, honoris causa, from the University of Manitoba.

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West Virginia University
School of Medicine

Dr. John N. Simpson, dean since the establishment of the school, reached the retirement age in July. Dr. Edward J. Van Liere, professor of physiology, has been appointed acting dean.

Plans for reorganization of the school to meet prescribed requirements are under way.

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Vanderbilt University
School of Medicine

Promotions: Drs. William R. Cate, Robert C. Derivaux and Hollis E. Johnson, to be associate professors of clinical medicine; Drs. William Bush Anderson and Milton S. Lewis, associate professors of clinical obstetrics; Dr. Benjamin H. Robbins, associate professor of pharmacology; Dr. John M. Lee, associate professor of clinical pediatrics; Dr. Henry Carroll Smith, associate professor of clinical ophthalmology; Dr. Edward H. Barksdale, associate professor of urology; Dr. John S. Cayce, assistant professor of clinical obstetrics; W. Ray Bryan, Ph.D., assistant professor of physiology; Dr. Henry L. Douglass, assistant professor of clinical urology.

A gift of $2,500,000 has been received from the General Education Board for enlargement of hospital and teaching facilities in obstetrics and pediatrics. About $700,000 will be used for new buildings and equipment, the remainder for endowment.

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New York University
College of Medicine

Gifts for Research: Carnegie Corporation of New York, $8,750; Rockefeller Foundation, $1,000 for salaries of visiting teachers; $1,250 for research in neurology under Dr. Foster Kennedy; Georgia Warm Springs Foundation for research on poliomyelitis under Dr. William H. Park; other donors, $2,160.47; Bernard M. Baruch, $3,092.93 for studies on pneumonia under Dr. Milton B. Rosenbluth; International Cancer Research Foundation, $1,500 for research in cancer under Robert Chambers, Ph.D., Washington Square College, New York University; E. R. Smith and Sons, $1,250 for a fellowship in the department of surgery; Mrs. Alfred F. Hess, $1,000 to establish the Alfred F. Hess Nutrition Fund under direction of Dr. Jacques M. Lewis.

Promotion: Dr. James A. Shannon from instructor to assistant professor of physiology; Dr. Meyer J. Kutisker from instructor to assistant clinical professor of surgery; Dr. Edward M. Livingston from instructor to assistant clinical professor of surgery.

A plan for graduate study in radiology leading to the degree of doctor of medical

science was approved and added to the list of similar courses already offered in other departments.

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University of Pittsburgh
School of Medicine

Dr. Stanley S. Smith, associate professor of ophtholmology, has been appointed professor to succeed Dr. W. W. Blair. Dr. Geo. J. Wright was appointed professor of neurology to succeed the late Dr. Thomas M. T. McKennan.

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New York Post-Graduate
Medical School

An intensive four-weeks' course in tuberculosis will begin September 3, under the direction of Dr. George G. Ornstein. The problem of pulmonary tuberculosis in all its phases will be presented. Fee, $100.

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Stanford University
School of Medicine

Post graduate medical courses for practicing physicians will be given September 10-13, inclusive. The subjects to be covered are: cardiology; diseases of the chest; obstetrics and gynecology; proctology; medical aspects of syphilis and its treatment; surgical anatomy, with special reference to operative approach and technic; ophthalmology. A registration fee of $20 will be charged. Lectures will also be given on nephritis and hypertension; glandular diseases and their treatment and gastro-intestinal diseases.

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University of Oklahoma
School of Medicine

The Board of Regents removed Dr. Lewis J. Moorman, dean and professor of clinical medicine from the deanship, and dropped Dr. H. D. Moor, professor of bacteriology and assistant to the dean, from the faculty. In protest, three members of the faculty, including Dr. Horace Reed, professor of surgery, resigned.

Dr. Robert U. Patterson, former surgeon general of the U. S. Army, retired, has been appointed to succeed Dr. Moorman as dean. Dr. Moorman has resigned from the faculty.

General News

Jessie Horton Koessler Fellowships

The Institute of Medicine, Chicago, announces that two Jessie Horton Koessler fellowships of $500 each have been awarded for the aid of research in biochemistry, physiology, bacteriology or pathology. The recipients of these fellowships are Mr. Robert A. Bussaberger of Northwestern University, Clayton G. Loosli, Ph.D., University of Chicago. Mr. Bussaberger will be associated with Dr. A. C. Ivy, professor of physiology in Northwestern University Medical School on "Hematological Studies of Gastrectomized Animals." Dr. Loosli will work under the direction of Professor O. H. Robertson, professor of medicine in the University of Chicago, on "Lung Phagocytes in Experimental Pneumonia."

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Neurological Institute, New York

Dr. Frederick Tilney, professor of neurology and neuro-anatomy at the College of Physicians and Surgeons of Columbia University, has been appointed to the new position of medical director of the Neurological Institute in a reorganization effected July 9. Dr. Dudley D. Roberts was named vice-president and chairman of the executive council, and twenty-five new trustees were added to the previous twenty-five. A new department is to be organized in association with the College of Physicians and Surgeons to develop research in physiology of the nervous system and it is also planned to enlarge the department of child neurology recently organized through the Friedsam Foundation under the direction of Dr. Bernard Sachs. Laboratory facilities will be extended to several additional floors of the institute.

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If Doctor Cannot Attend School, School Will Go to Doctor

The California physician of the future will not have to travel to a more or less distant medical center to study the latest developments in medical science, but will have that knowledge brought right to his own district or community, according to joint plans of the four medical schools of California and the California Medical Association.

The University of California Medical School has just concluded a series of postgraduate sessions in the districts centering about Santa Rosa, Sacramento, San Jose and Fresno. These sessions were held in collaboration with local groups of practicing physicians throughout the teaching year. The data developed were turned over to the California Medical Association, with the result that the Association House of Delegates, by unanimous vote, decided to sponsor a series of state-wide sessions.

A special committee was named by the Association to work out the details of these future meetings and clinics, and is receiving full cooperation of the four medical schools and a number of leading practitioners. Dr. Frederick C. Warnshuis, secretary of the Association, is giving the procedure his closest attention.

Book News

Objective and Experimental Psychiatry

By D. Ewen Cameron, M.B., Ch.B., D. P.M., Provincial Mental Hospital, Brandon, Manitoba, Canada. The Macmillan Company, New York, 1935. Price, $3.

The purpose of this book is to bring together in readily accessible form the natural evolution of a science toward quantitative methods, toward experimentation as the main method of fact finding.

The unregarded errors inherent in purely observational and "projectionistic" methods of obtaining knowledge are examined and in part their consequent effect upon present psychiatric concepts is traced. The organism is treated as an integrated whole, and consequently methods of evaluating behavior whether they are based on changes at the psychological, physiological or structural level are examined. The methods, techniques and results are reviewed.

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Diagnosis and Treatment of Skin Diseases

By Jacob H. Swartz, M.D., instructor in dermatology, Harvard Medical School, and Margaret G. Reilly, R.N., supervisor of skin diseases, Massachusetts General Hospital. The Macmillan Company, New York. 1935. Price, $3.50.

This book differs from other texts on dermatology in that it has been produced by the collaboration of a trained dermatologist and a nurse who has specialized in the nursing care of persons afflicted with skin diseases. Special attention is given to the details of treatment.

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The Rise of Modern Physics

By Henry Crew, professor emeritus of physics, Northwestern University. 2d Ed. The Williams and Wilkins Company, Baltimore. 1935. Price, $4.

A story of the origin and evolution of modern physics and of the workers who brought it to its present state of perfection. Will interest every reader to whom the romance of science has appeal. No technical knowledge is required of the reader.

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Biochemistry of Medicine

By A. T. Cameron, M.A., D.Sc., professor of biochemistry, and C. R. Gilmour, M.D., C.M., professor of medicine and clinical medicine, University of Manitoba. 2d Ed. William Wood & Company, Baltimore. 1935. Price, $3.

This book is designed both for the student of medicine receiving clinical instruction in the later years of his course, and for the physician who received no special instruction in the medical applications of biochemistry.

In this new edition the chapter on the endocrine secretions has been largely rewritten, and a brief account is included of the important discovery of anti-endocrine compounds.

A brief description of those disorders of digestion which possess some biochemical interest has been linked with a review of gastric and pancreatic functional tests; this has permitted a more systematic presentation of steatorrhoea and of the different diseases of which this is a feature.

The section dealing with pH has been somewhat enlarged, some account of cyanosis and dyspnoae has been included in the chapter on respiration, and an account has been given of the most recent work supporting normal carbohydrate diet in diabetes. New subjects dealt with briefly

include von Gierke's glycogen disease, the diseases concerned with incorrect lipoid storage, tyrosinosis, the dinitrophenol treatment of obesity, the glycine treatment of myasthenia gravis, and the pentose-nucleotide treatment of agranulocytosis.

Certain of the sections dealing with some of the rarer metabolic diseases have been condensed.

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The Autonomic Nervous System

By James C. White, M.D., assistant professor of surgery, Harvard Medical School. The Macmillan Company, New York. 1935. Price, $7.

This book is another monograph in the Macmillan surgical monographs. It presents the accepted anatomical, physiological and clinical knowledge which is necessary for an understanding of the disorders of the autonomic nervous system and their surgical treatment. The failures and successes of sympathectomy in certain much discussed conditions are presented. The mechanism of visceral pain is discussed in detail. The first part deals with neuro-anatomy, physiology and pharmacology. The second part takes up the newer methods of investigating abnormal visceral function and visceral pain. Accepted operations on the sympathetic, splanchnic, vagus and pelvic nerves are described and illustrated. The book also discusses the technic and application of the new method of sympathetic nerve block with alcohol in poor risk cases of cardiac and malignant disease.

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Gynecological and Obstetrical Tuberculosis

By Edwin M. Jameson, B.B., M.D., fellow of Trudeau Foundation and attending surgeon, Saranac General Hospital. Lea & Febiger, Philadelphia. 1935. Price, $3.50.

The author assembles the newer aspects of female genital tuberculosis. He covers (1) the alterations in the pathological physiology of the female genital apparatus brought about by pulmonary tuberculosis, (2) the various forms of female genital tuberculosis, and (3) a broad survey of the problem of pregnancy in the tuberculous woman, with suggestions for the management of the various types of cases in the light of modern phthisiology. The literature of the past decade is reviewed and a complete bibliography is appended.

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Principles and Practice of Medicine

Originally written by the late Sir William Osler. 12th Ed. Revision by Thomas McCrae, M.D., professor of medicine, Jefferson Medical College. D. Appleton-Century Company, New York. 1935. Price, $8.50.

Although forty-three years have passed since the publication of the first edition of this book in 1892, it still remains a classic. This edition has been revised completely by one who is thoroughly competent to follow in the footsteps of the master in the field. Doubtless, it will receive the cordial reception at the hands of the profession which the book so richly deserves.

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Synopsis of Regional Anatomy

By T. B. Johnston, M.B., Ch.B., professor of anatomy, University of London, Guy's Hospital Medical School. Lea & Febiger, Philadelphia. 1935. Price, $4.50.

This work offers a thorough review of anatomy for those who have already studied the subject in a larger text and have had the experience of dissecting the cadaver. It will be particularly valuable to those who are preparing to take State Board or National Examinations and to surgeons who wish to review rapidly particular fields in which they are to operate. The lately revised Basle Anatomical No-

menclature (B.N.A.) is used throughout its English form. For the benefit of those who are more familiar with them, the original B.N.A. terms are included in brackets in most places where alterations have been introduced. A glossary of the principal alterations in terminology is included in the preliminary matter, making reference extremely simple and rapid. The sections treated include the upper and lower limbs, the thorax, the abdomen, the head and neck, the central nervous system and organs of special sense, and the work is concluded with a new and useful section on osteology. Here is a practical summary of the essentials of anatomy that will be found increasingly useful.

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Textbook of Clinical Neurology

By I. S. Wechsler, M.D., professor of clinical neurology, Columbia University. 3d Ed. W. B. Saunders Company, Philadelphia. 1935. Price, $7.

The text has been revised in keeping with modern developments in this field. A number of minor and major clinical syndromes have been added; also many new references and illustrations. A new feature is a chapter on the history of neurology added to stimulate interest in this field. A good book.

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Diseases of the Nervous System

By Smith Ely Jelliffe, M.D., and William A. White, M.D., professor psychiatry, George Washington University. 6th Ed. Lea & Febiger, Philadelphia. 1935. Price, $9.50.

Many portions have been rewritten, new methods of examination have been added and the text has been thoroughly revised. The sections on the vegetative nervous system, on the newer surgery of the sympathetics, on the endocrinopathies, particularly the pituitary sections, on the spinal lesions, especially the encephalomeylitides, and on the symbolic system have been rewritten in the light of new knowledge concerning them. The authors view the human organism as a system engaged in the capture, transformation and delivery of energy and subject to the laws of the universe of which it is a part. They show that the difficulties which man encounters within himself and in his environment, impeding him in the satisfaction of his desires, result in the disturbances that they have collected as diseases of the nervous system. In this work they offer the key to the solution of many riddles heretofore considered insoluble. While the authors indicate clearly the vast territory yet to be explored in this infinite field, every definitely established advance up to the date of publication is here recorded.

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Midwifery

By Ten Teachers, including Comyns Berkeley, Victor Bonney, J. S. Fairbairn and Clifford White. 5th Ed. William Wood and Company, Baltimore. 1935. Price, $6.

The entire ten have separately and together edited and revised every chapter, so avoiding the disadvantages of collective authorship. The work is a companion volume to Berkeley: *Diseases of Women*, which is by the same authors.

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Puerperal Gynecology

By J. L. Bubis, M.D., consultant in obstetrics and gynecology, Mt. Sinai Hospital, Cleveland. William Wood & Company, Baltimore. 1935. Price, $3.50.

Those who have followed the development of gynoplastic repairs will recognize much of the material used in this book as having appeared in reports previously published. It is an advocacy of the repair of old and new lacerations shortly after childbirth, fortified with records of many thousands of cases under the author's care.

Martini's Principles and Practice of Physical Diagnosis

Edited by Robert F. Loeb, M. D., associate professor of medicine, Columbia University, College of Physicians and Surgeons. Translated by George J. Farber, M. D. J. B. Lippincott Company, Philadelphia. 1935.

Compact, concise, yet comprehensive, stressing the use of the senses in the recognition and evaluation of disease. An excellent book for the medical student.

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Textbook of Biochemistry

Edited by Benjamin Harrow, Ph. D., associate professor of chemistry, College of the City of New York, and Carl P. Sherwin, M. D., New York City. W. B. Saunders Company, Philadelphia. 1935. Price, $6.

The thirty contributors to this work are all well known as authorities in the fields of chemistry, biology, pharmacology, physiology and medicine. The text is planned for both teachers and students. It is sufficiently inclusive to fill the needs of a diversified group. A distinct novelty is a chapter on the cell as an introduction to biochemistry. The chapters on immuno-chemistry and the chemistry of bacteria represent new and fertile fields for the expansion of knowledge. Appended to each chapter is a list of carefully selected references. The bibliographic index at the end of the book will delight every worker in this field. It contains thousands of references listed under the authors' names.

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The Kidney in Health and Disease

Edited by Hilding Berglund, M. D., Stockholm, Sweden. Formerly chief of the department of medicine, at the University of Minnesota; and Grace Medes, Ph. D., research biochemist in the Lankenau Hospital Research Institute, Philadelphia; with the collaboration of G. Carl Huber, M. D., University of Michigan; Warfield T. Longcope, M. D., Johns Hopkins University; and Alfred N. Richards, Ph. D., M. D., University of Pennsylvania. Lea & Febiger, Philadelphia. 1935. Price, $10.

An important symposium on the structure and function of the kidney in health and disease was held some time ago in Minneapolis. It was instituted by Dr. Hilding Berglund, then Professor of Medicine in the University of Minnesota, and was conducted under the auspices of that institution.

This book represents the contributions to the symposium, amplified and revised by each of the forty-one contributors to cover the recent advances and to conform with the latest conceptions. Several important contributions which were not included in the original symposium have been added and the entire work has been thoroughly edited with the collaboration of some of the original contributors.

The text is divided into six chapters: I. Anatomy and Physiology; II. Clinical Aspects of Renal Functions; III. Bright's Disease and Various Other Pathologic Renal Conditions; IV. Albuminuria and Edema; V. Ocular Changes in Bright's Disease; VI. Clinical Aspects of Bright's Disease. Many fine illustrations, tables and bibliographic references add much to make this the outstanding contribution to the knowledge of diseases of the kidney.

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Anatomy of the Leg and Foot

By Phillippa N. Vaus, M. R. C. S., L. R. C. P., London, England. William Wood & Company, Baltimore. 1935. Price, $2.

This book is intended for use by students and practitioners of chiropody. Contains in small compass an amazing amount of information clearly written and well arranged.

The American Illustrated Medical Dictionary

Seventeenth Edition. W. B. Saunders Company, Philadelphia. 1935. Price, $7.50.

As a well known manufacturer of an automobile has said: "Ask the man who has one." This is one book which should have a place on the desk of every student and physician. It has grown since the first edition to be a veritable encyclopedia of medical terms, their definitions, origin and pronunciation as well as of almost everything we need to know or learn. It has more than doubled its size since the first edition, an evidence that the revisers are on the alert for words, methods and procedures which may have value for the user. It is no longer a medical dictionary. It is a medical encyclopedia. Only he who makes daily use of this book can appreciate it at its full value.

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Diet and Like It

By Mabel E. Baldwin, Ph.D. D. Appleton-Century Company, New York. 1935. Price, $2.50.

A practical book for those who are overweight and take the matter seriously and also for those who wish to avoid the accumulation of unsightly or unhealthy fat. Distinguishing this book from others on the subject are two immediately recognizable points of superiority.

First, the author puts major emphasis upon a *safe* diet. Secondly, Miss Baldwin's entire plan is so worked out that it requires no special cookery and can be followed as readily in the restaurant as in the home.

Part I is devoted entirely to menus, which offer a large variety of foods. Specific directions are given as to what foods should be eaten and how much of each. Part II shows how to convert the reducing diet into a protective diet for weight maintenance, giving concrete information on nutritional principles, caloric values, etc.

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National Medical Monographs

(Six.) Published by the National Medical Book Company, New York. 1935. Price per volume, $4.

1. Abnormal Arterial Tension. By Edward J. Stieglitz, M.S., M.D., assistant clinical professor of medicine, Rush Medical College, University of Chicago.

2. Obstetrics for the General Practitioner. By J. P. Greenhill, B.S., M.D., professor of gynecology, Loyola University.

3. Industrial Medicine. By W. Irving Clark, A.B., M.D., assistant professor, and Philip Drinker, S.B., Ch.E., associate professor of industrial hygiene, Harvard Medical School.

4. Management of Colitis. By J. Arnold Bargen, M.D., associate professor of dermatology, University of Chicago.

5. Commoner Diseases of the Skin. By S. William Becker, M.S., M.D., associate professor of dermatology, University of Chicago.

6. Diseases of the Chest. By J. Arthur Myers, M.D., professor of medicine, preventive medicine and public health, University of Minnesota Medical School.

These books are of convenient size, attractive in appearance, printed in readable type on a dull paper, except for the illustrations, which are sufficient in number and well made. Doubtless they will have a wide appeal for readers who like to go deeply into a single subject by means of a convenient source.

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Experimental Physiology

By Maurice B. Visscher, Ph.D., M.D., Professor of Physiology, and Paul W. Smith, Ph.D., Associate in Physiology, University of Illinois, College of Medicine. Lea & Febiger, Philadelphia. 1935. Price, $3.25.

This work is designed to help the student to understand the significance of his observations, to familiarize him with the different types of experimental methods, and to aid him in acquiring some degree of critical judgment concerning the value of scientific evidence. To this end it offers a collection of experiments suitable for laboratory use. It helps the student to distinguish between important and unimportant determinants, provides facts from which he may learn to reason inductively, and assist in the development of a critical attitude towards generalizations and deductions. With this material he will learn to distinguish between objectively obtained facts and reasoning based directly or indirectly upon such facts.

Since the work is designed for classroom and laboratory use, it necessarily involves the employment of classical experiments. They have, however, been altered to suit the facilities and restrictions of such work. While the authors disclaim originality in the majority of the experiments, their arrangements and alterations will add greatly to their effectiveness. Numerous illustrations with anatomical and mechanical features clarify the text and increase its value. An appendix containing information concerning chemical methods and the preparations of materials, dosages of drugs, and other reference data will be found exceptionally helpful. The introductory material includes general directions for the preparation of animals for experimentation, and important data on the use and care of apparatus. The work is clearly written and will give direction and effectiveness to every laboratory course.

Public Health Administration In the United States

By Wilson G. Smillie, M.D., Dr. P.H., Professor of Public Health Administration, Harvard School of Public Health. The Macmillan Company, New York. 1935. Price, $3.50.

The administrative principles of public health organization are presented in a comprehensive way, with a description of and application of these principles in the various units of government in the United States. Part I: Functions of a health organization; historical review. Part II: Administrative control of communicable diseases. Part III: Basic activities of a health organization. Part IV: Organization of public health programs.

There is a real need for a book of this type.

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Clinical Diagnosis By Laboratory Methods. A Working Manual of Clinical Pathology

By James C. Todd, late Professor of Clinical Pathology, University of Colorado, School of Medicine, and Arthur H. Sanford, Professor of Clinical Pathology, University of Minnesota, Mayo Foundation, 8th Ed. W. B. Saunders Company. 1935. Price, $6.

A thorough revision of each chapter; new chapter on clinical chemistry; chapter on blood rearranged; many new tests and methods of examination. The appendix has had added to it an abridged outline of a classification of schizomy petes, directions for the preparation of a number of intravenous solutions and a table of normal values. The index-outline of laboratory findings in important diseases is extremely valuable and should make a strong appeal to students.